

ConfoScan4

Service Manual



CE
0123

Manual information:

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NOTE: **ConfoScan4 and CS4 are synonymous**

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INTRODUCTION

This service manual provides information for after sales service of the ConfoScan4 (also called CS4). For proper after sales service, it is necessary to understand this manual thoroughly before the servicing. Refer to the ConfoScan4 Operator's manual & Service Manual Annex together with this manual. Specifications for improvement are subject to change without notice. In case the equipment cannot be repaired according to the procedure described in this manual, please contact us, reporting the serial number and the details of the symptom.

1 Safety Precautions

1.1 General precautions

- Servicing should be performed only by NIDEK trained personnel.
- Perform all servicing according to the procedure described in this manual. Failure to do so may cause unexpected accident or malfunction.
- Be sure to turn the power off and unplug the power cord during servicing, unless there is different instruction.

1.2 Maintenance precaution

- Take countermeasures against static electricity before servicing.
- If malfunction occurs, check the symptom and turn the power off
- Do not lose or drop removed parts inside the CS4.
- Take care not to bump the CS4.
- Prepare storage cases for removed screws and parts to ensure against loss.
- Use suitable tools to screw or unscrew the screws.
- Apply thread locking adhesive to the screws which have been loosened and tightened again.
- After the replacement, check that all parts are fixed in their original positions securely and turn the power on.
- If the CS4 produces smoke or strange odors, immediately turn off the system, and disconnect the electrical plug from the outlet
- Usage of the system under such abnormal conditions may cause fire or electric shock.
- Do not perform servicing with wet hands. Doing so could cause electric shock or malfunction.
- In “1.5”, when checking a break in a cable, also check the following according to the wiring diagram and connector cable.
 - (1) Proper crimping
 - (2) Proper contact by connecting and disconnecting connectors
 - (3) Proper soldering
- Do not yank the cables with excessive force. Doing so could cause breakage.

1.3 Handling the optical system parts

- Do not disassemble or repair optical system parts.
- If the optical system parts need repairing, return the whole device to NIDEK.
- The person, who assembles, adjusts, or repairs the optical system will be responsible for the final result.
- ONLY the following parts in the optical system are replaceable:
 1. Camera CS3-HE701
 2. Target Led Board CS4-EL009
 3. Lamp Fan CS4-EL046
 4. W Control Board CS4-EL027
 5. Optical Head Board Assembly CS4-AP068

1.4 Adjustment precautions

- Adjust the CS4 on a horizontal and stable surface. Failure to do so could hinder proper adjustment.
- Do not touch the optical parts such as mirrors or lenses.
- If the cover must be opened for electrical operation check or reparation, ensure against electric shock.

1.5 Troubleshooting

To the beginning of every service, perform these controls:

- Connect the power cord and turn on the equipment.
- Check if the system configurations, or the settings, are changed.
- Check if the software has updated.
- Check the electronic fan board.
- Check the head lamp fan

Perform in sequence, the operations and the checks indicated in “Action”. The Nidek Technologies Service can help you, during the check procedures. Before the replacement procedures, contact the Nidek Technologies Service.

Symptom analysis	Action
The equipment does not operate and the power switch does not light.	Check the power voltage of the wall outlet Check the fuses. Check the power switch of equipment.
The equipment does not operated while the power switch light is turned on.	Check the power supply. Check the power filter Check the processor board. Check the display assembly.
The equipment is turned on and the display works properly. The joystick does not start the exam.	Check the immediate stop button (if activated, reset it). Check the motion control board. Check the processor board. Check the presence of the front lens
The equipment is turned on, and the display works properly. If you push on any buttons of the keyboard or the joystick, the equipment does not operate.	Turn off the equipment. Wait a few minutes. Turn on and retry the operation. If the problem persist. (1)Check the processor board. (2)Check the joystick assembly. (3)Check the joystick control board. (4)Check the serial board.
The equipment is turned on, and the speaker emits a sound “beep”, but the display doesn’t work properly.	Check the display assembly. Check the processor board.
The equipment works correctly, but the speaker does not emit the “beep” sound at the end of the exam recording.	Check the speaker and the connector. Check the buzzer of processor board.
The equipment works correctly but the images aren’t of good quality.	Clean the lenses 40X and 20X , only with soft cloth and distilled water. The coating is very fragile.
The head does not move correctly or move roughly, or move with noise.	Check the robot assembly. Check the photocell of mechanical parts
An error message appears on the display.	Contact the Service Department of Nidek Technologies.

2 Position of the CS4 Covers

Here below is shown the position of the device covers. The covers must be removed and mounted in a specific order. Follow the instructions.

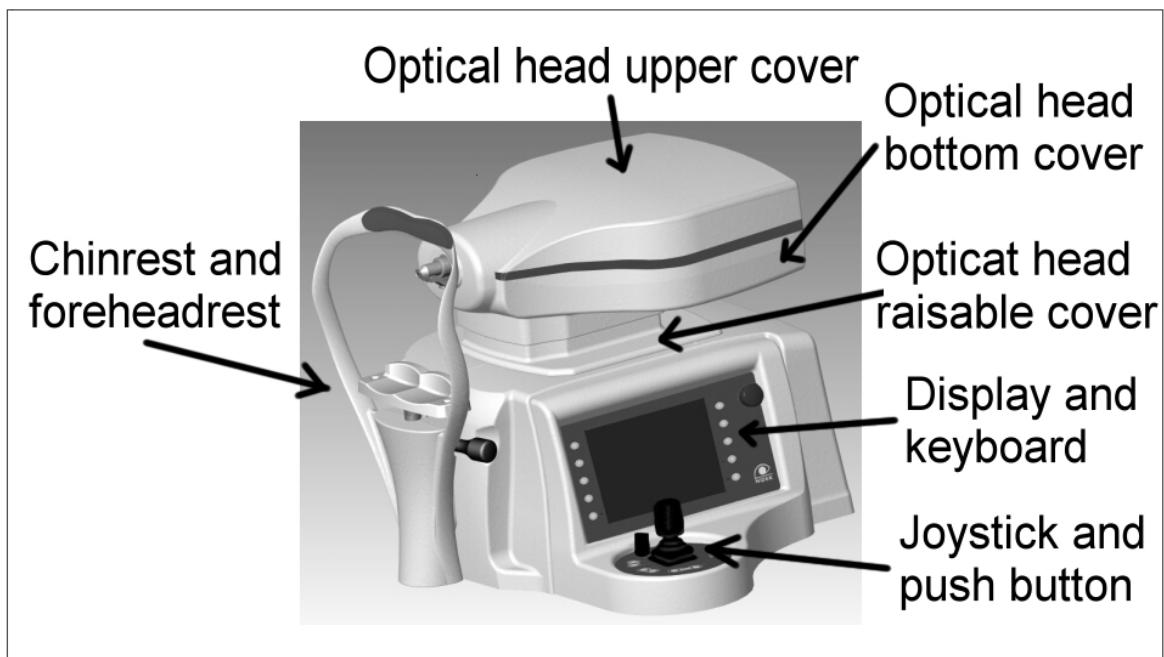


Figure 1 Overview of the device

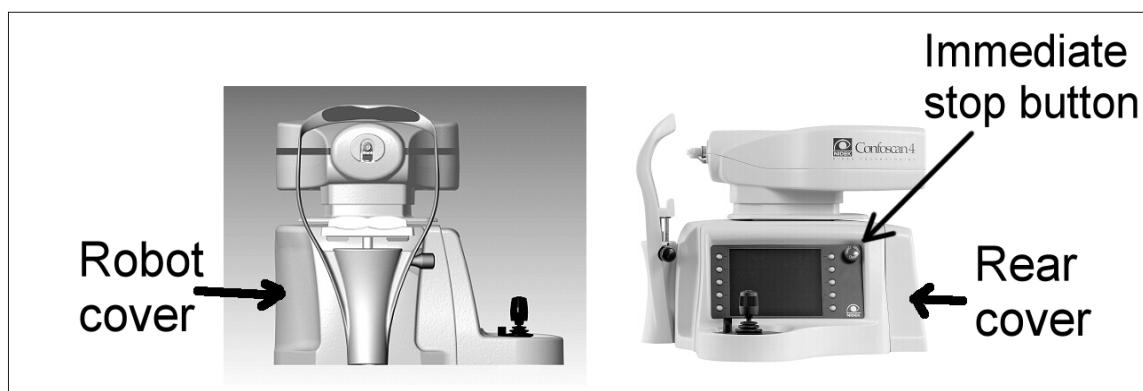


Figure 2 Second Overview of the device

3 Embedded PC

In this picture it is shown the Embedded PC CS4-EL074.

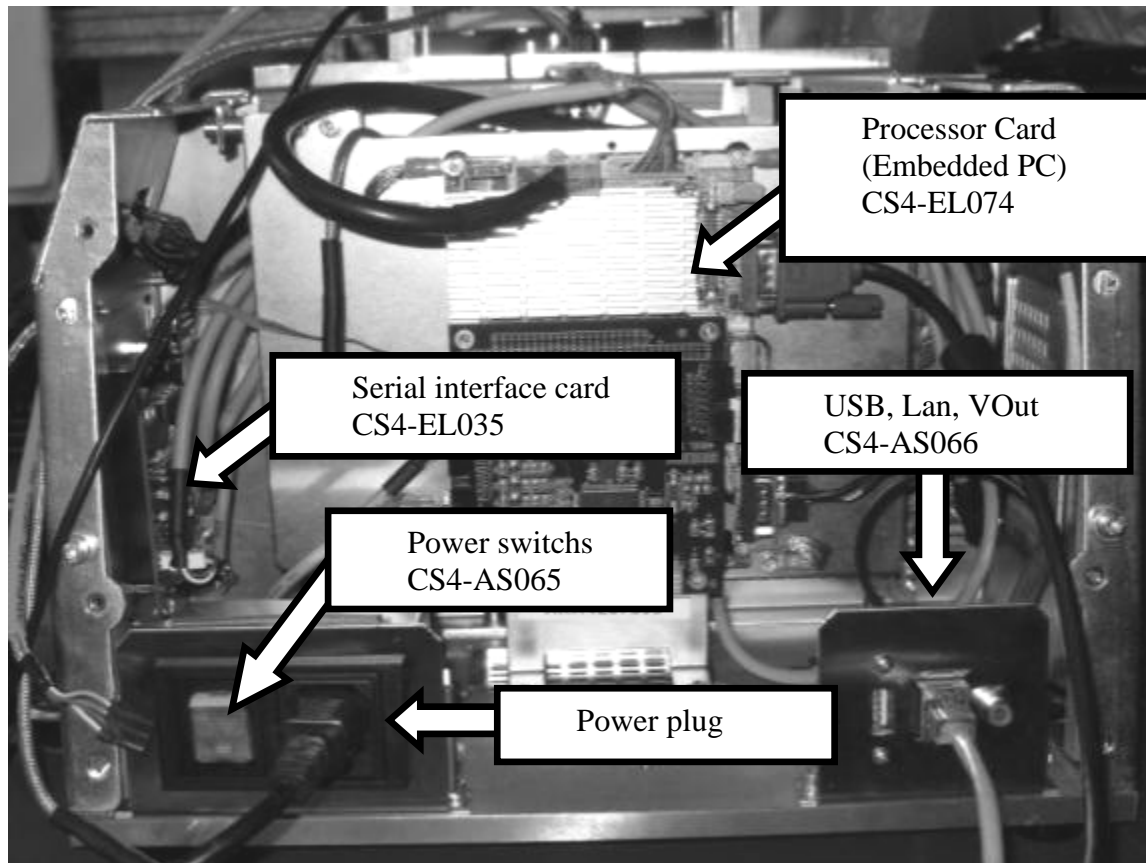


Figure 3 Embedded PC

4 Motion control Board

Here below is shown the inner motion components of the device.

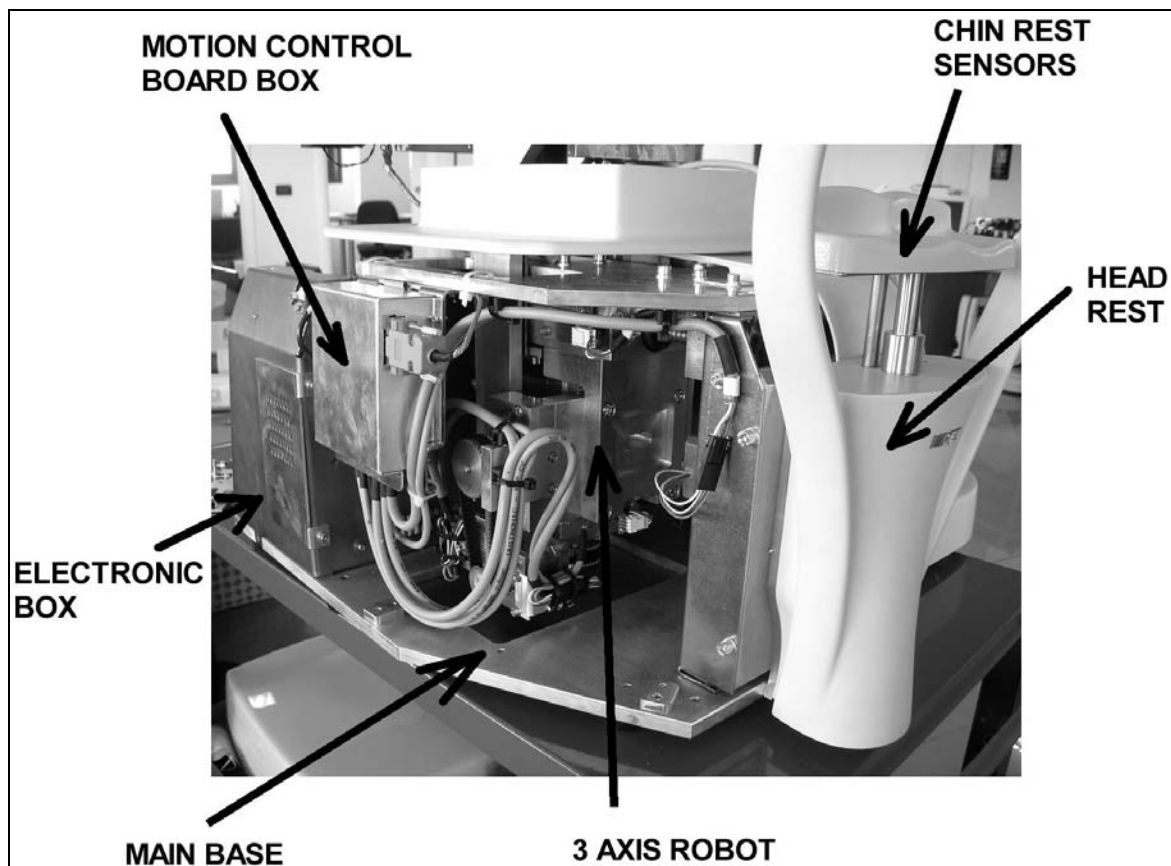


Figure 4 Motion Board

5 Remove the fuses

Open the fuses holder, under the power inlet, and remove the fuses.



Figure 5 Fuses holder

6 Remove the rear cover (CS4-ST050)

Unscrew the 4 screws and remove the external cover.



Figure 6 CS4-ST050



Figure 7 Rear Cover CS4-ST050 Removed

6.1 Remove the rear metallic internal cover

- Unscrew the 4 screw and remove the rear metallic internal cover (CS4-ST123).



Figure 8 CS4-ST123

7 Remove the electronic board & fan

If you have not already done, perform the procedure no.:

6 Removing the rear external plastic cover

6.1 Removing the rear metallic internal cover

7.1 Remove the fan

- Unscrew the 4 screws on the CS4-ST123, than you are able to remove the fan.

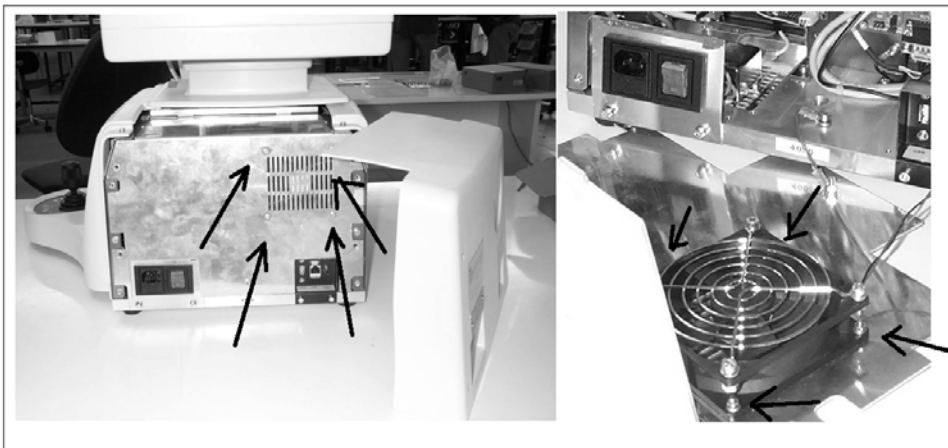


Figure 9 Fan screws

- Electronic Fan removed CS4-EL034



Figure 10 Electronics fan CS4-EL034

7.2 Remove the VGA to PAL Board CS4-EL042

If you have not already done, perform the procedure 6, & 6.1.

Disconnect the cables P1, P2, P3, from the board; unscrew the 4 nuts “N” than remove the board.

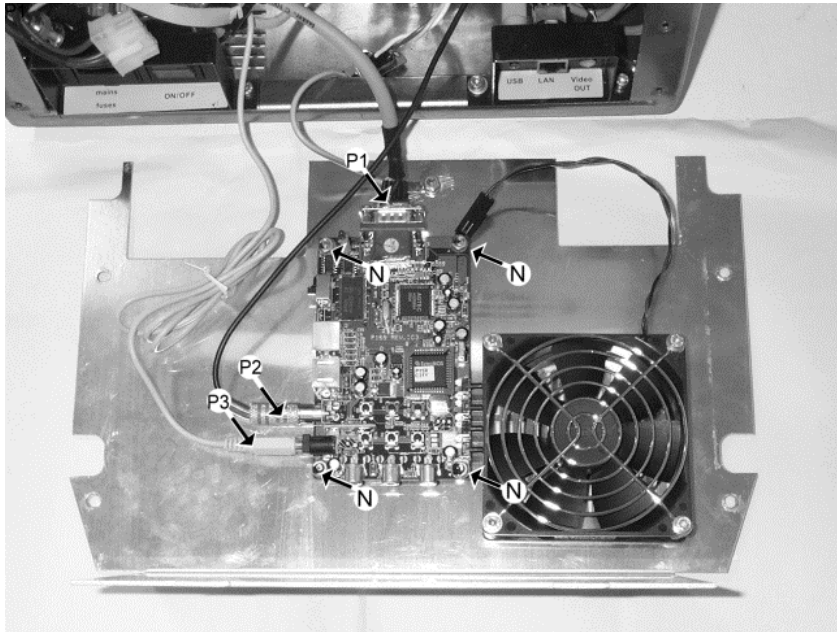


Figure 11 VGA to PAL board CS4-EL042

- Don't loosen or remove the 2 screws of rear cover bars.

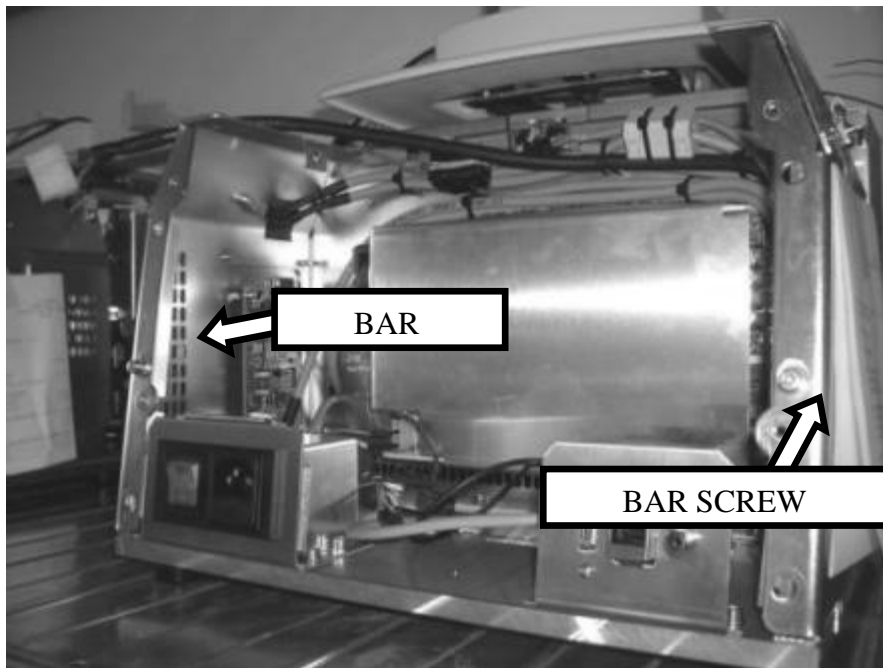


Figure 13 Bar screws

8 Remove the signal inlet plate

If you have not already done, perform the procedure 6, & 6.1.

Disconnect the signal cables than unscrew the 2 screws back to the sheet metal.

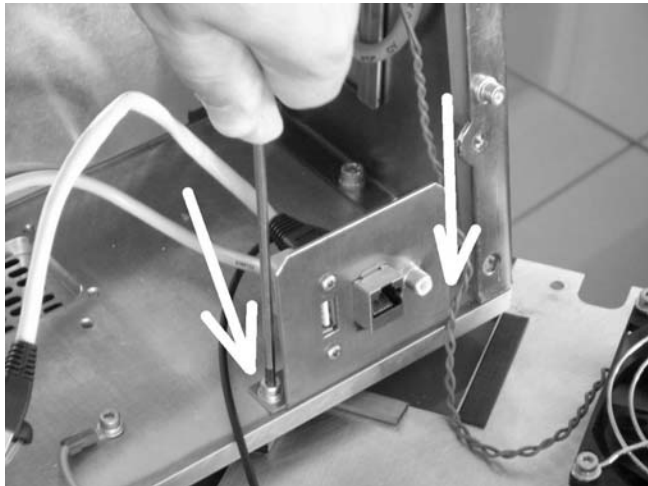


Figure 14 Signal inlet plate screws

- Remove the signal inlet plate CS4-AS066.

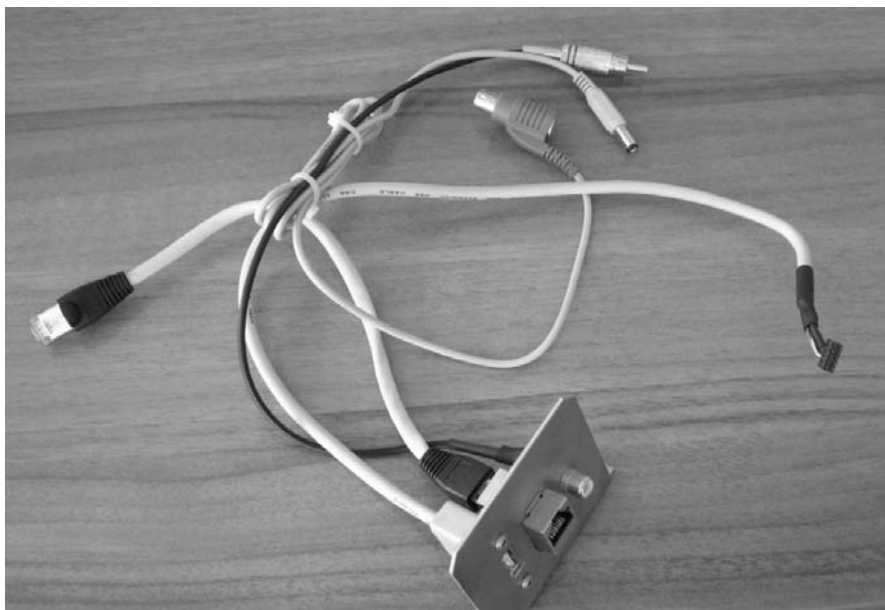


Figure 15 Signal inlet plate CS4-AS066

9 Remove the power switch and the power inlet

If you have not already done, perform the procedure:

6 Removing the rear external plastic cover

6.1 Removing the rear metallic internal cover

- Unscrew the 2 screws of the metal cover and remove it.

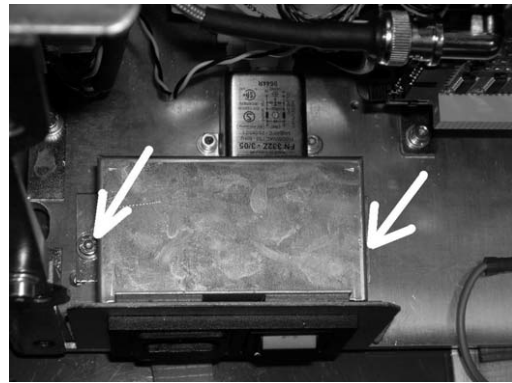


Figure 16 Power switch metal cover

- Unscrew two screws that fix the inlet power support to the base plate of the instrument.

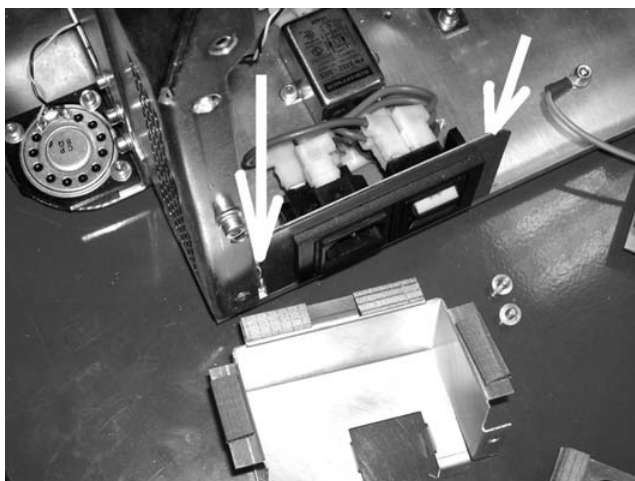


Figure 17 Power inlet metal cover

- Disconnect the cables and remove the power switch and power inlet plate.

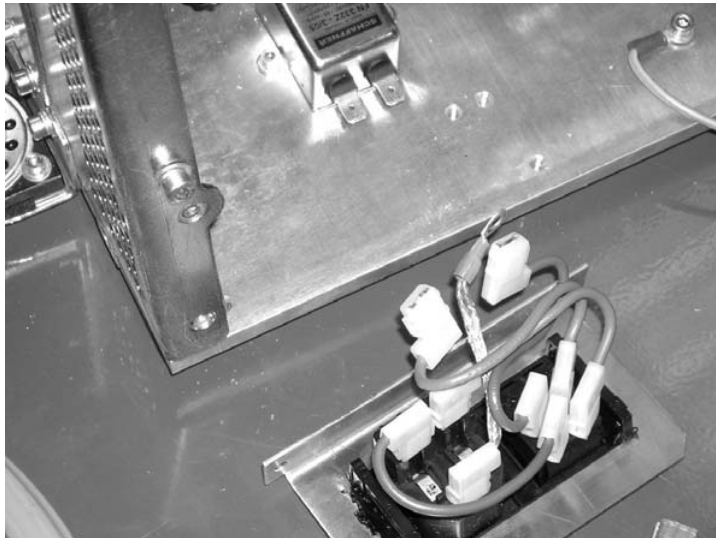


Figure 18 power inlet plate removed



Warning: when the power inlet metal cover is reassembled, pay attention to avoid any damage to the main voltage cables. You have also to connect properly the grounding cable (stranded wire) by fixing its screw.

10 Embedded PC Assembly CS4-AP073

If you have not already done, perform the procedure no.:

6 Removing the rear external plastic cover

6.1 Removing the rear metallic internal cover

10.1 Removing the frame grabber

In this picture are showed the cables that connect the frame grabber and the pc board to the device.

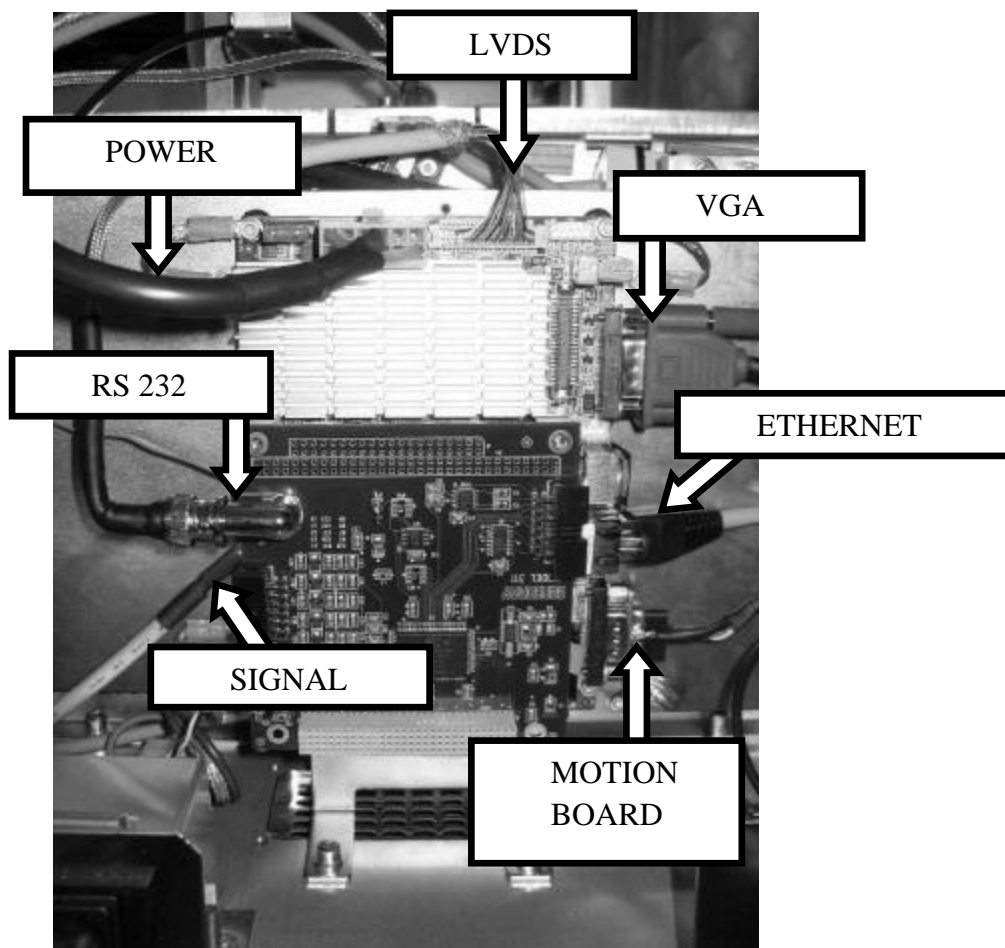


Figure 19 CS4-AP073

10.1 Remove the frame grabber board (CS4-EL044)

When you remove the parts; take note of wiring and connectors. When you replace the part; reconnect the new one in the same way. Remove the video cable connector (BNC) and the two fixing screws.

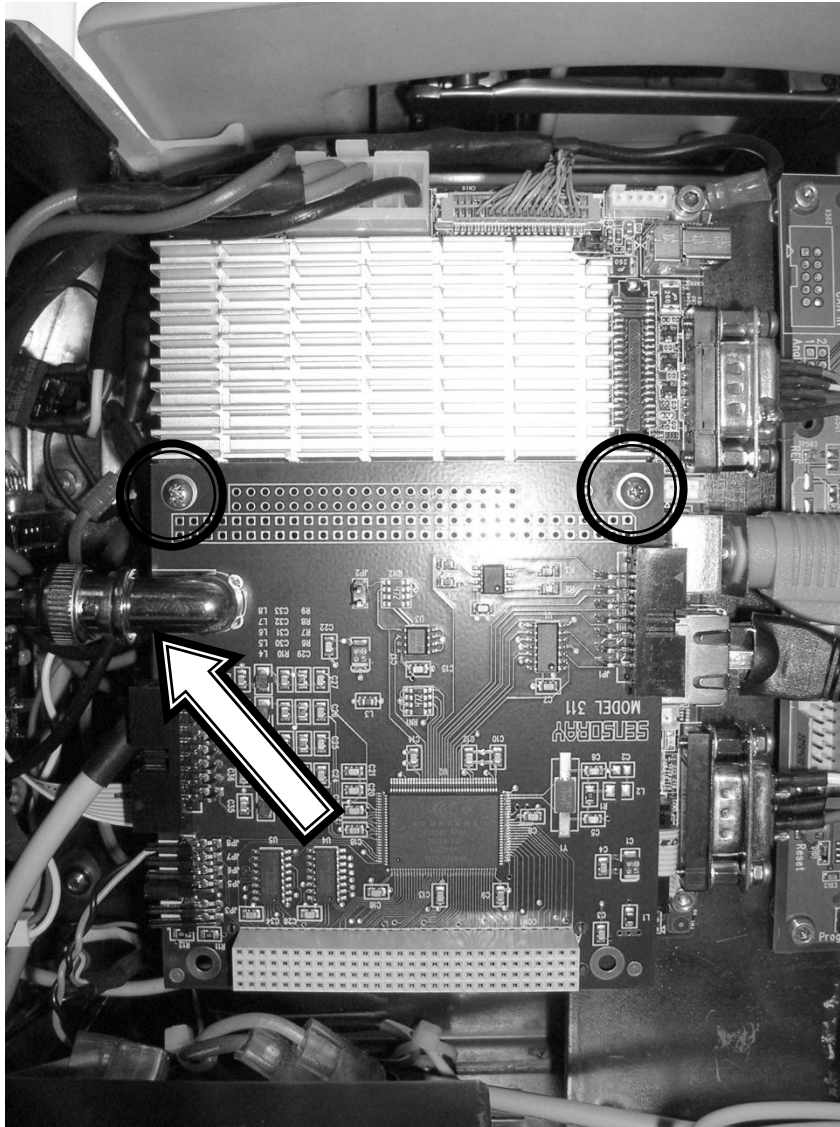


Figure 20 Frame grabber video cable and screws

10.2 Remove the Embedded PC (CS4-EL074)

When you remove the part, take note of wiring and connectors (especially for USB, speaker, RS485 connectors). Remove the cables illustrated on the figure below (follow the sequence):

- Power connector
- RS232
- Audio speaker
- Motion board
- PS2
- Ethernet
- LVDS
- VGA

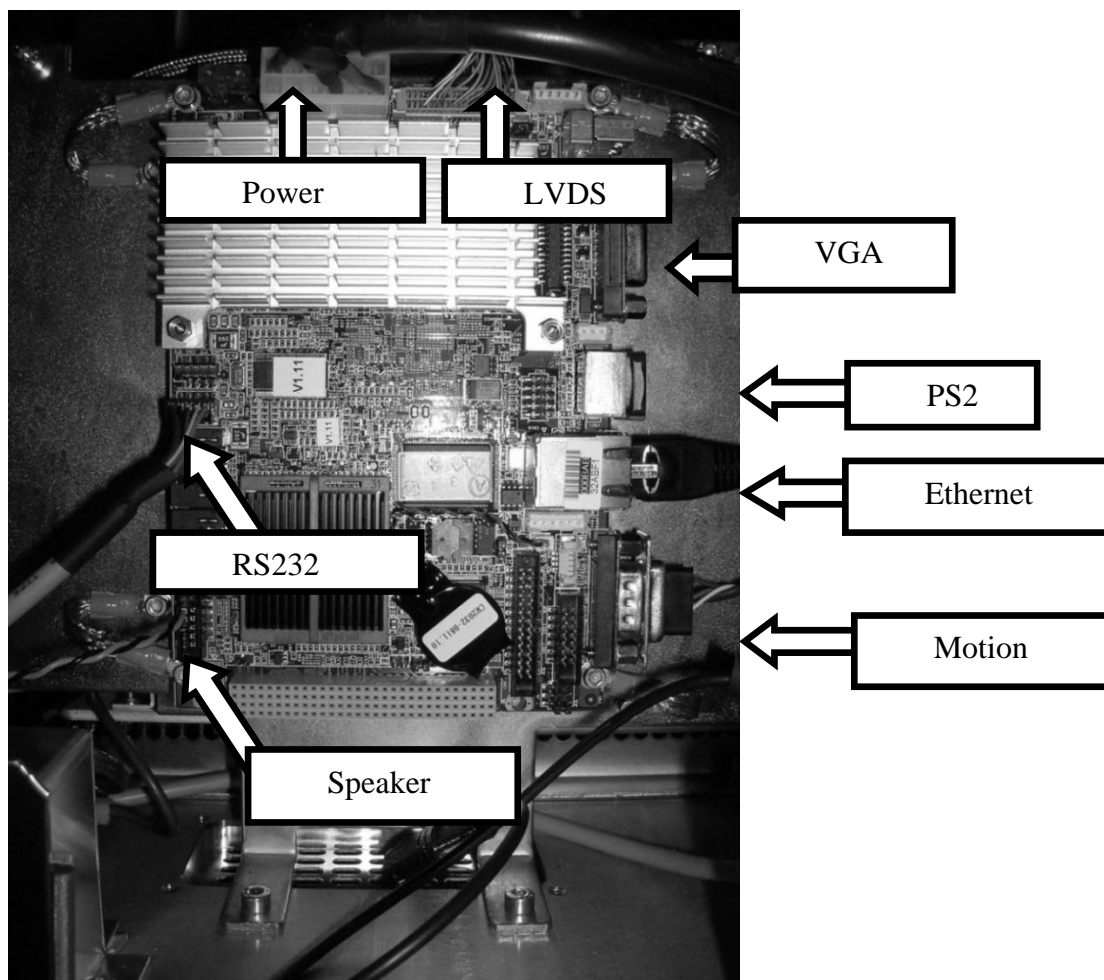


Figure 21 Embedded PC cables

- Unscrew the PC fixing screws (see figure below).

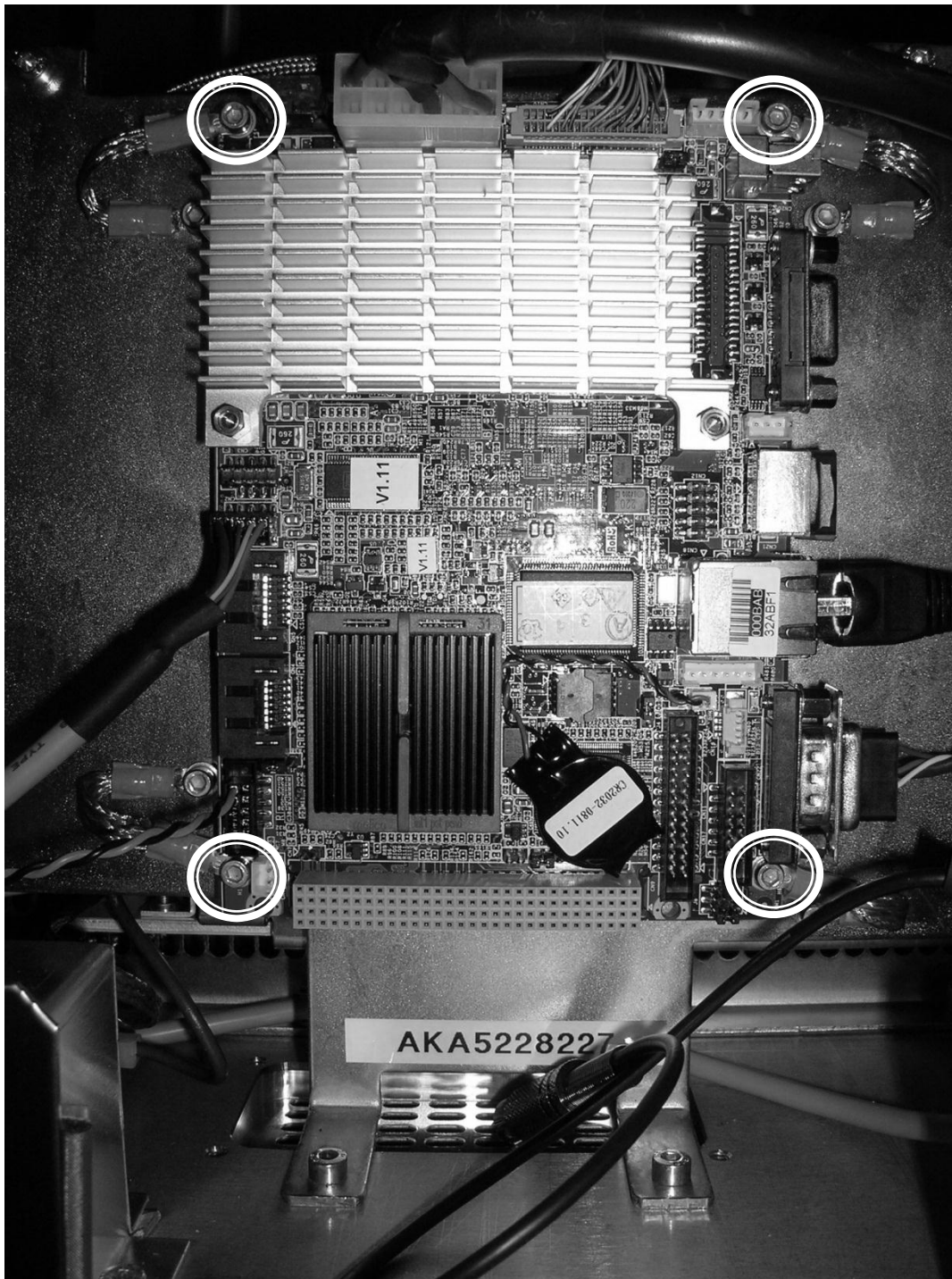


Figure 22 Embedded PC fixing screws

- Remove the screws that fix the Motion board and the VGA, and then disconnect them.

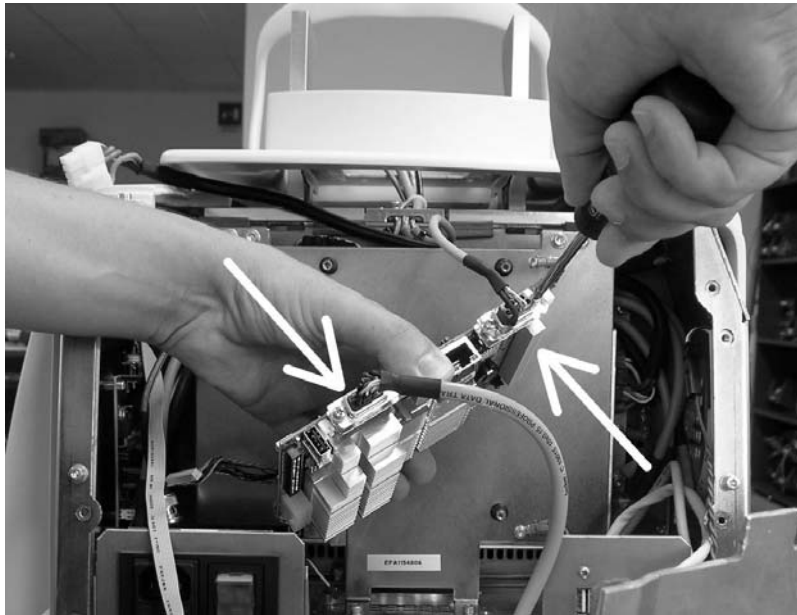


Figure 23 Cables removing



Warning: Put it in safety place. This card contains unit's calibration data. Do not change with other CS4 unit flash cards.

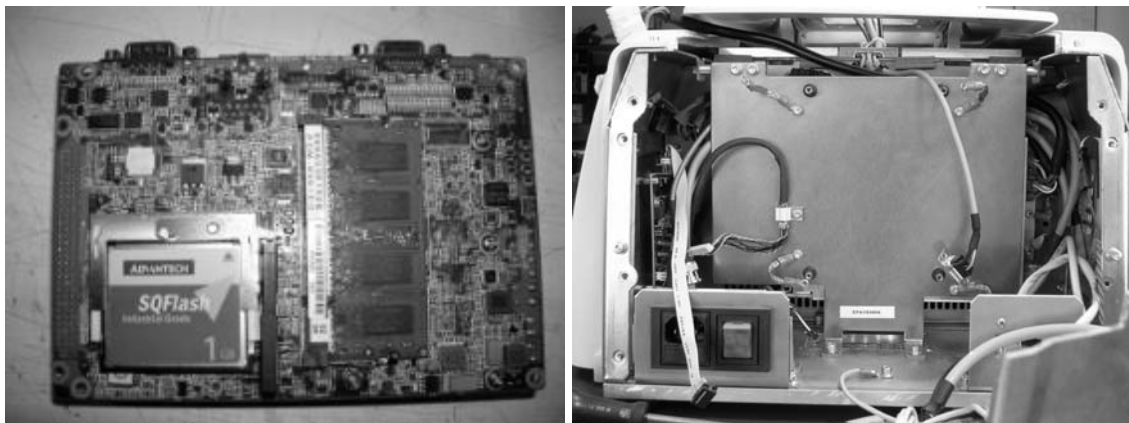


Figure 24 Flash card CS4-EL076

11 Remove the Joystick assembly CS4-AP036

If you have not already done, perform the procedure:

6 Removing the rear external plastic cover

To remove this cover you have to unscrew the 4 screws showed in the picture.

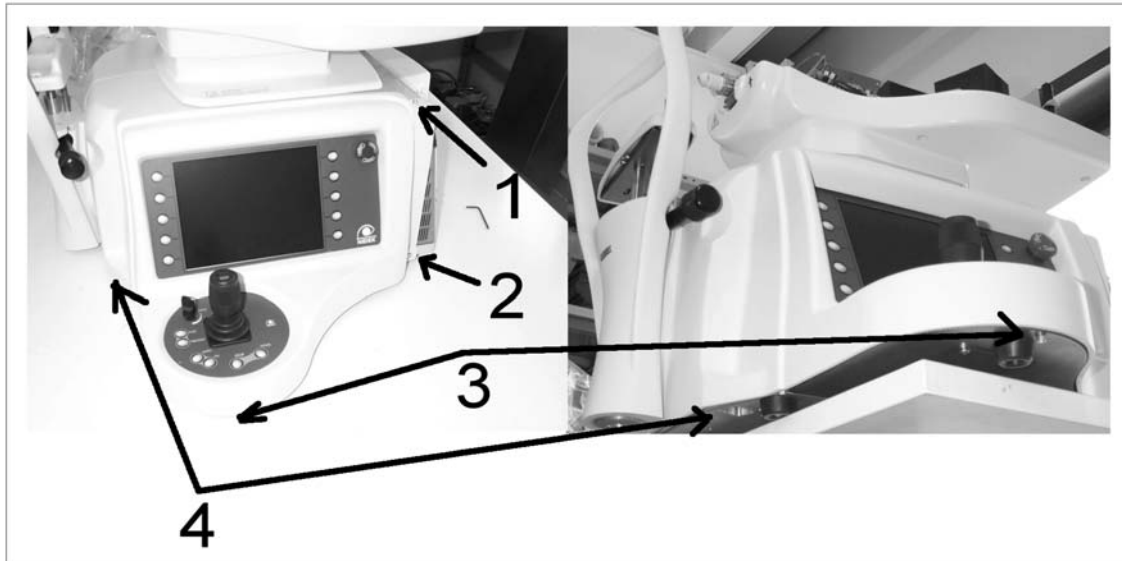


Figure 25 CS4-ST056

- Pay attention to the screws n° 3 & 4, they are under the equipment. Do not turn upside down the equipment.

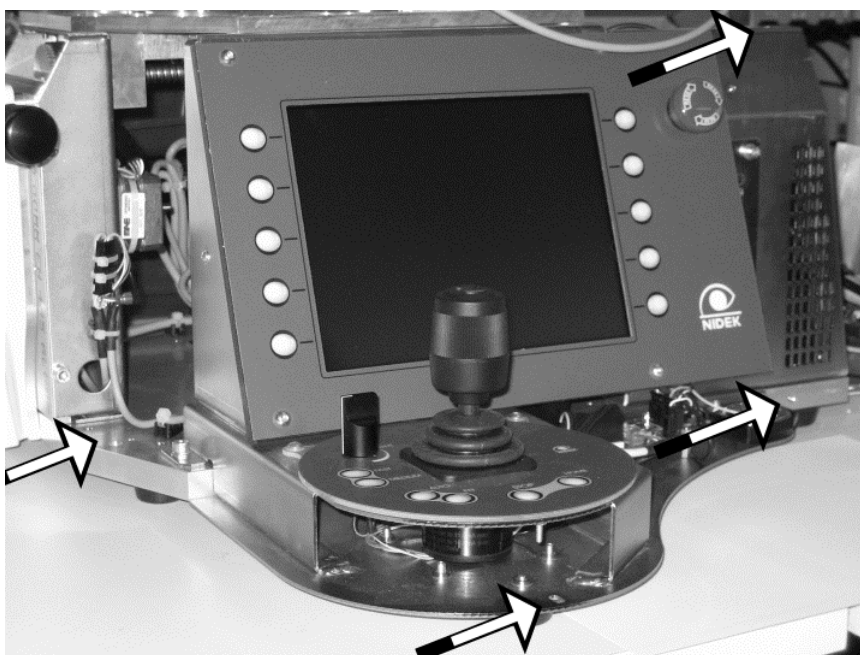


Figure 26 Screws position

- The screw number 4 is under the equipment as shown in the picture.



Figure 27 Screw n°4

- When you remove the operator side plastic cover, pay attention to do not damage the joystick, and the cover. It is possible pull up a little bit the cover in order to gain space during the removing of the operator side plastic cover CS4-ST056.

11.1 Remove the joystick assembly step one

Before you have to unscrew the 2 screws and the nut (showed in the figure below).

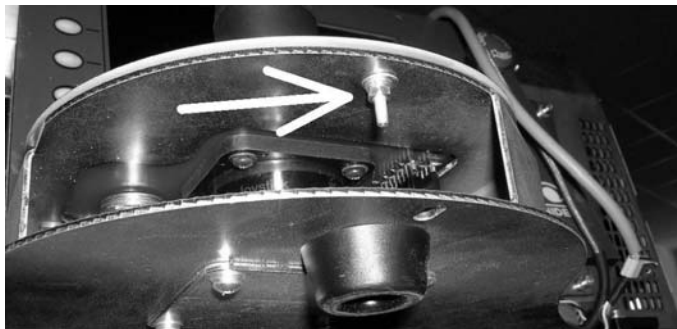
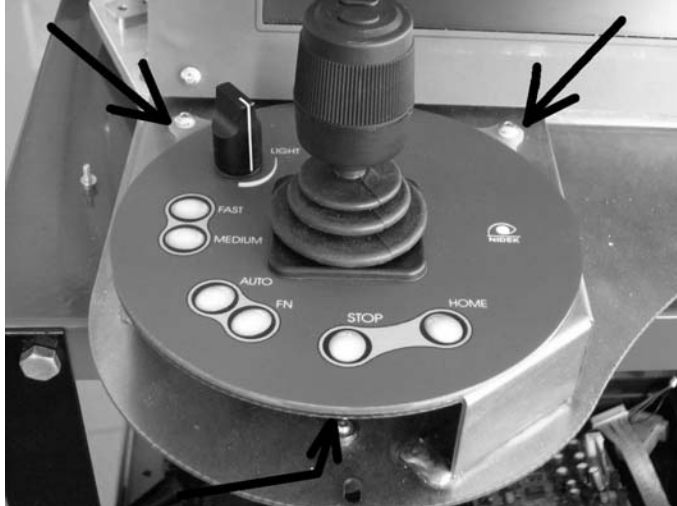


Figure 28 Joystick screw

11.2 Remove the joystick assembly step two

- Unscrew the four screws that fix the LCD panel. Open little bit as in the figure below (do not pull completely the LCD panel, because there are cables connected behind).

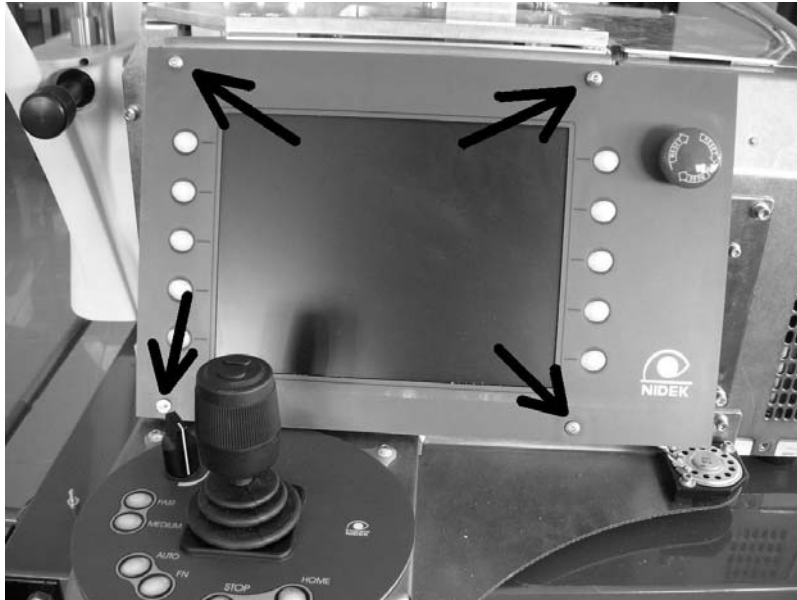


Figure 29 LCD panel screw

To open better the LCD panel and to gain more access inside the LCD box, disconnect the emergency stop button cable.

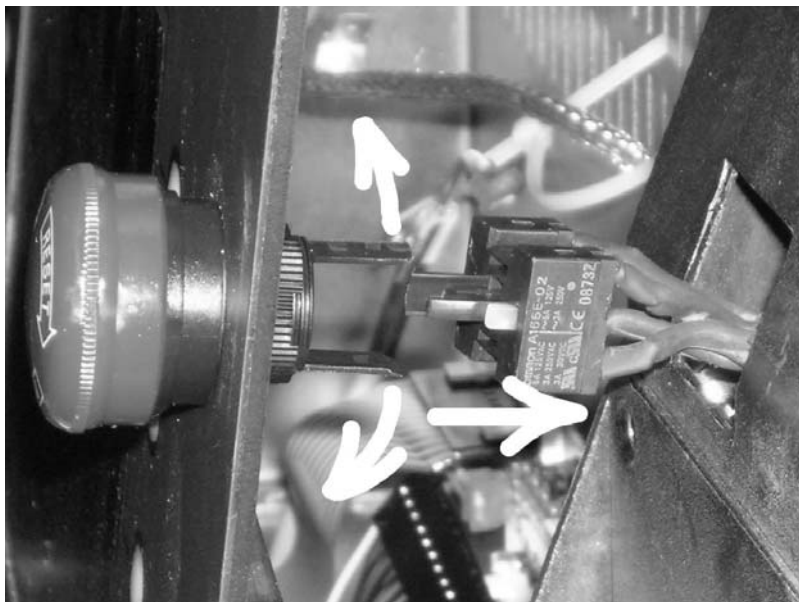


Figure 30 Cable disconnection

11.3 Remove the joystick assembly step three

- Disconnection of the LCD flat cable and unscrew the ground cable.

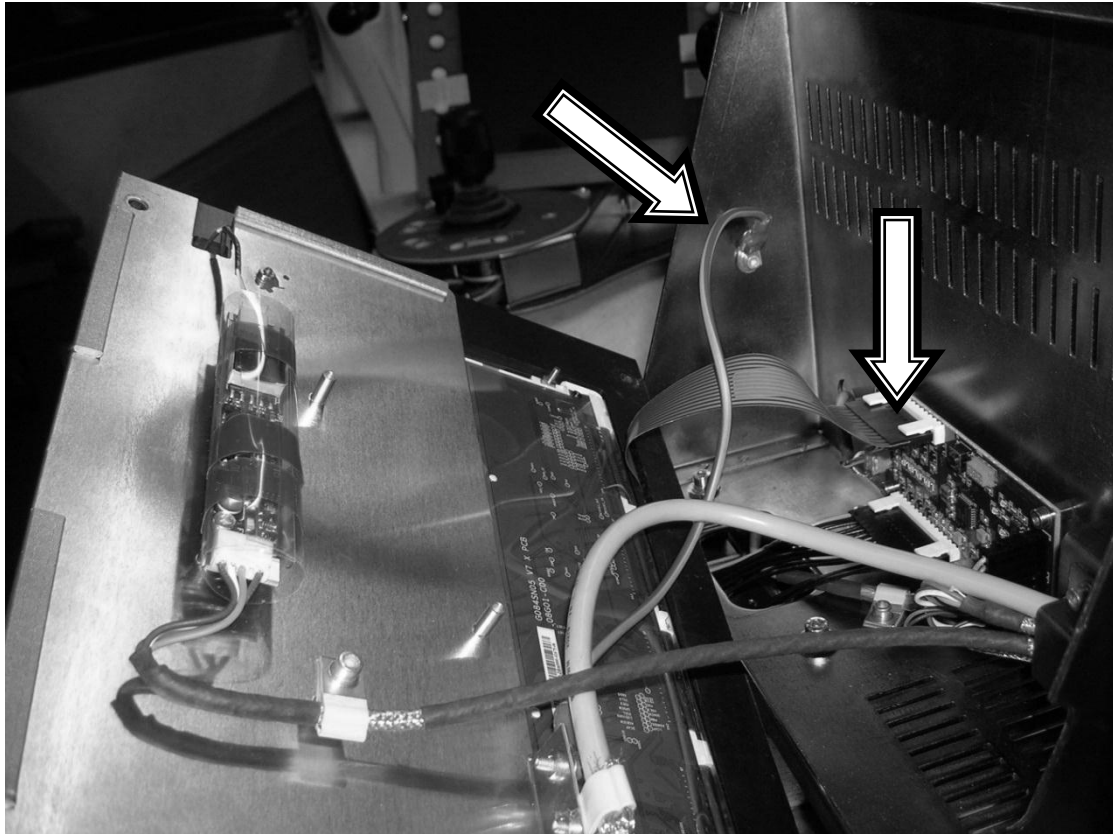


Figure 31 Disconnection of the LCD

- Disconnect the 2 cables lamp intensity knob cable, push button and the joystick cable. Unscrew the screw that locks the joystick cable on the device.



Figure 32 Joystick cables

- Remove the Joystick and push button assembly CS4-AP036



Figure 33 Joystick assembly CS4-AP036

11.4 Remove the Joystick control board (CS4-EL010)

If you have not already done, perform the procedure:

6 Removing the rear external plastic cover

11 Removing the operator side plastic cover

11.3 Disconnect the Display LCD panel

- Remove all connectors from the board

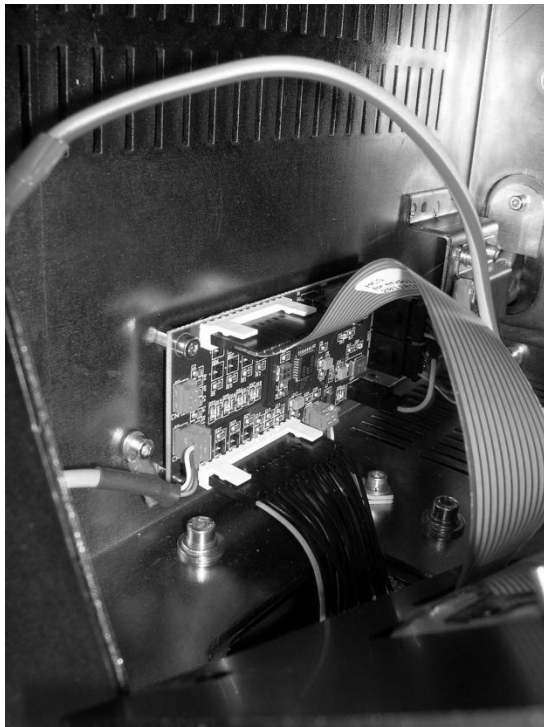


Figure 34 Joystick board connectors

- Remove the joystick board by unscrew the 4 screws

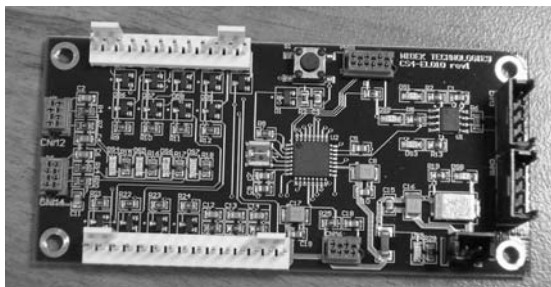


Figure 35 Joystick board

12 Remove the Display LCD panel

If you have not already done, perform the procedure:

6 Removing the rear external plastic cover

11 Removing the operator side plastic cover

Unscrew the 4 screws (see figure below).

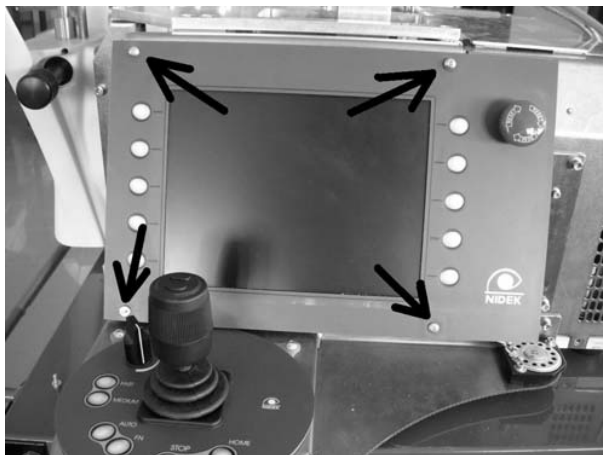


Figure 36 Display screws

- Unhook the clips and disconnect the emergency switch and cable from the red button (pay attention: do not bend too much the switch body retainers to avoid damages) Remove the ground cable (yellow/green). Remove the emergency stop button cables

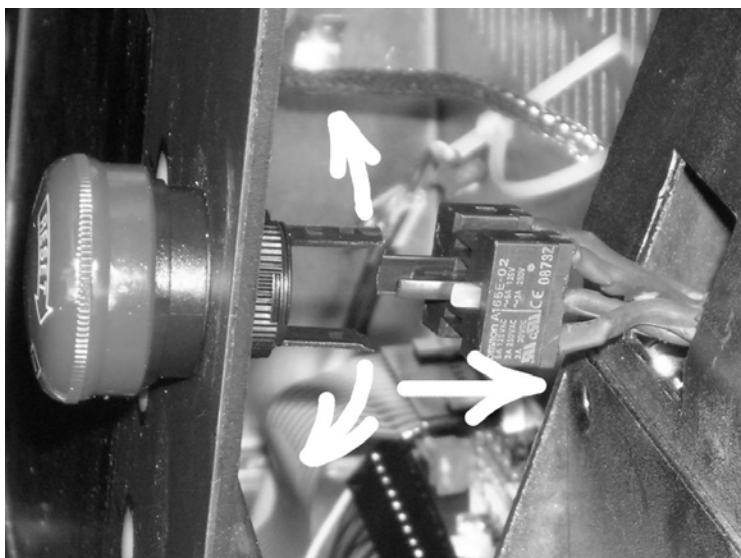


Figure 37 Emergency button

- Unscrew the Ground cable

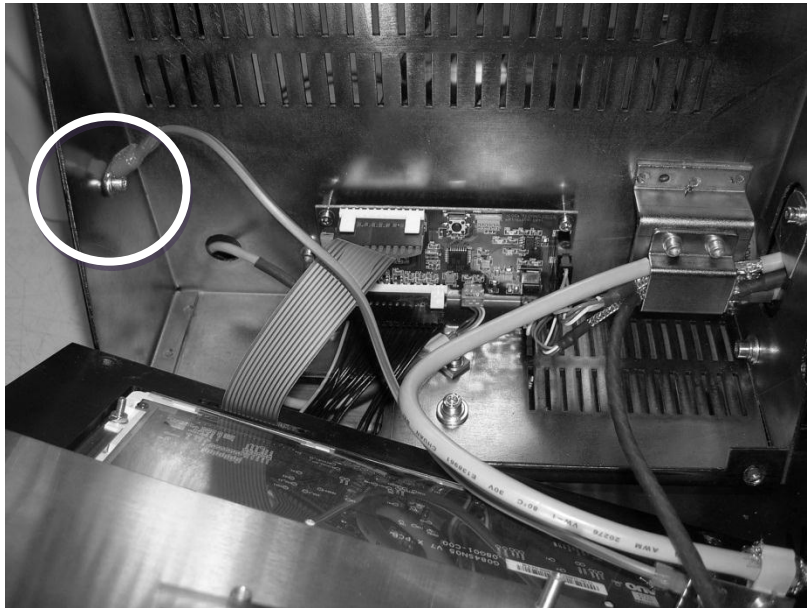


Figure 38 Ground cable

- Remove the LCD panel buttons connector from the joystick board

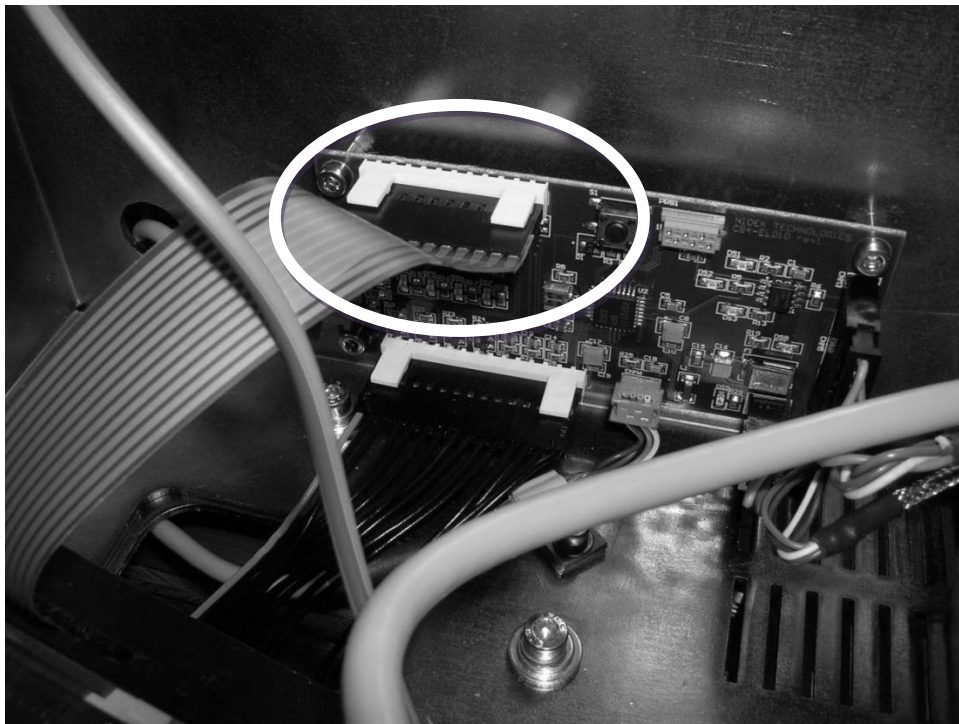


Figure 39 LCD panel buttons connector

- Remove the LVDS connector from the LCD than the screw of the LVDS shield fixing.

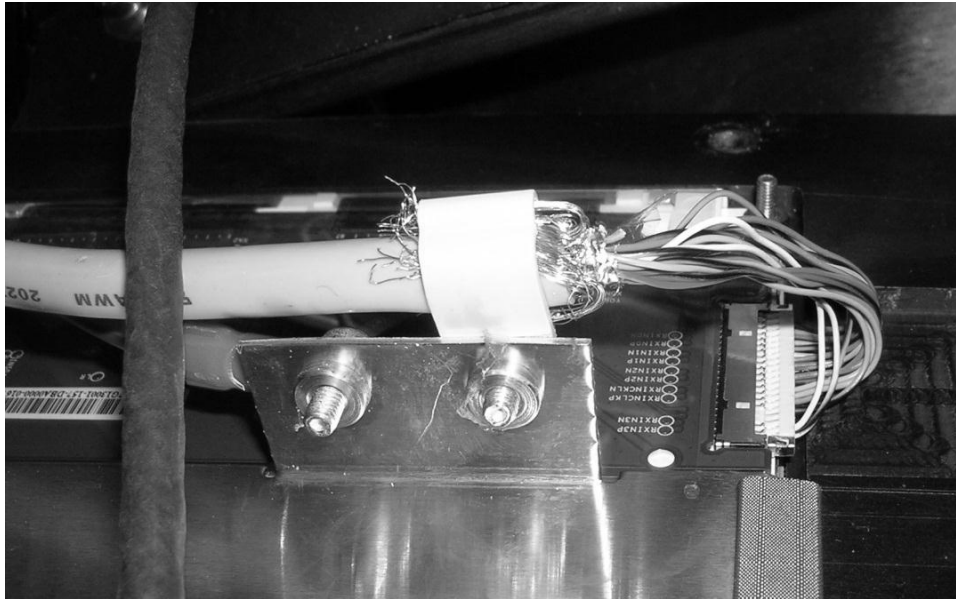


Figure 40 LCD LVDS shield & connector

- Remove the LCD inverter power cable and its shield fixing.

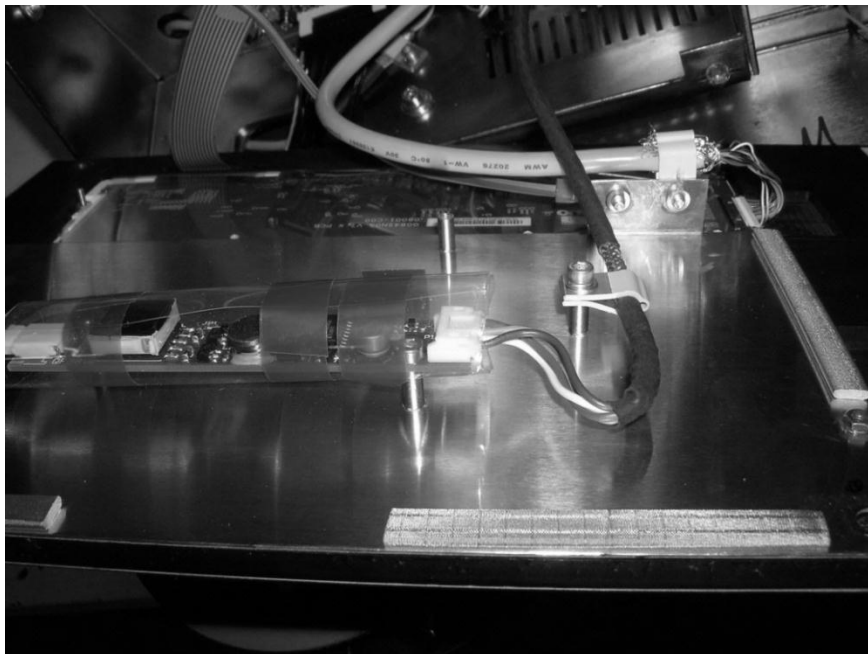


Figure 41 LCD Inverter power cable

Now the LCD panel is free for complete removing.

13 Remove the serial board (CS4-EL035)

If you have not already done, perform the procedure no.:

6 Removing the rear external plastic cover

6.1 Removing the rear metallic internal cover

11 Removing the operator side plastic cover

Disconnect the 485 serial connector (flat cable coming from embedded PC) from the serial board as illustrated in the figure below

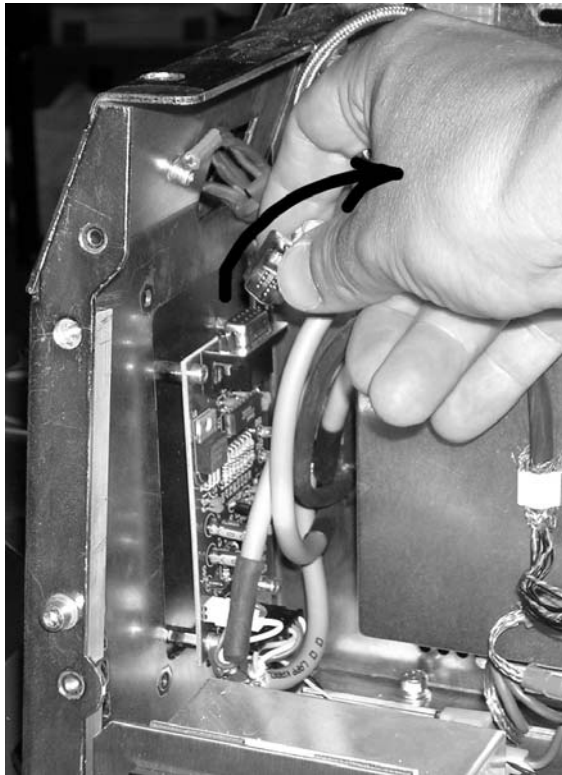


Figure 42 Serial board screws

- Unscrew the four screws that fix the LCD panel. Open a little bit as illustrated in the figure below (do not pull completely the LCD panel, there are cables connected behind).

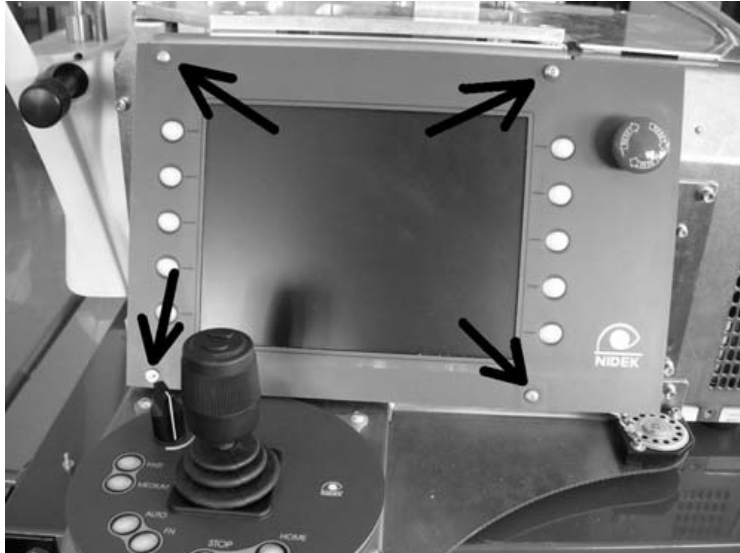


Figure 43 LCD Panel

- Unhook the clips and disconnect the emergency switch and cable from the red button (pay attention: do not bend to much the switch body retainers to avoid damages) Remove the ground cable (yellow/green). Remove the emergency stop button cables.

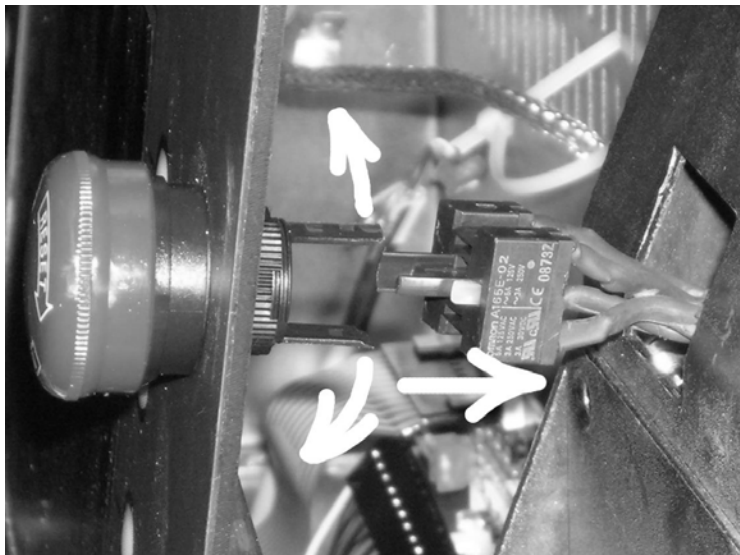


Figure 44 Emergency button

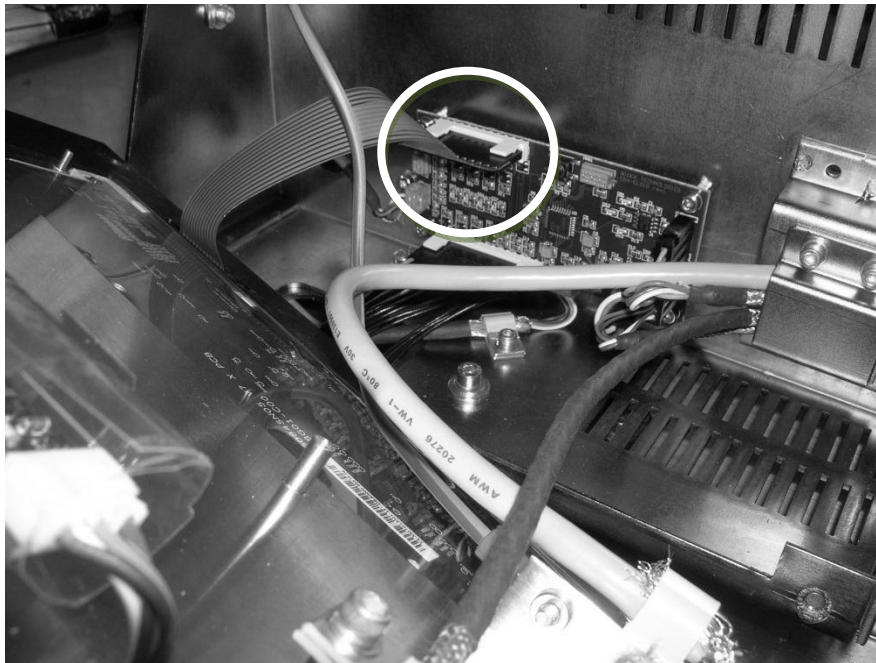


Figure 45 LCD panel buttons flat cable/connector

- Rotate the LCD panel to gain better access to the serial board metal plate support. To remove it, unscrew the 4 screws as shown in the picture below.

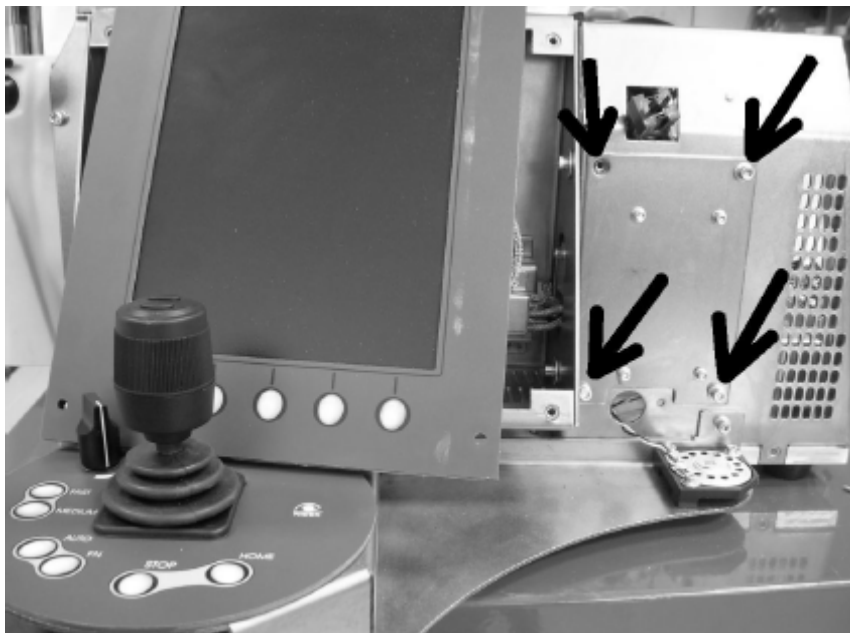


Figure 46 Serial board screws

Take the sheet metal for unscrew the board.

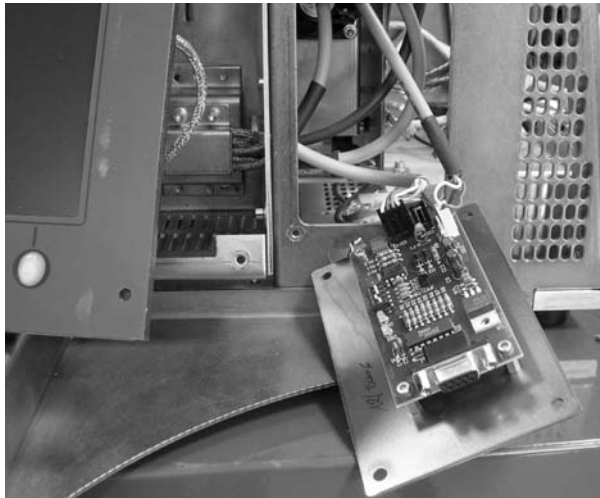


Figure 47 Serial board

- Disconnect the signal cables, the power cables and the ground connections.
- Unscrew the 4 screws that hold the board on the sheet metal.

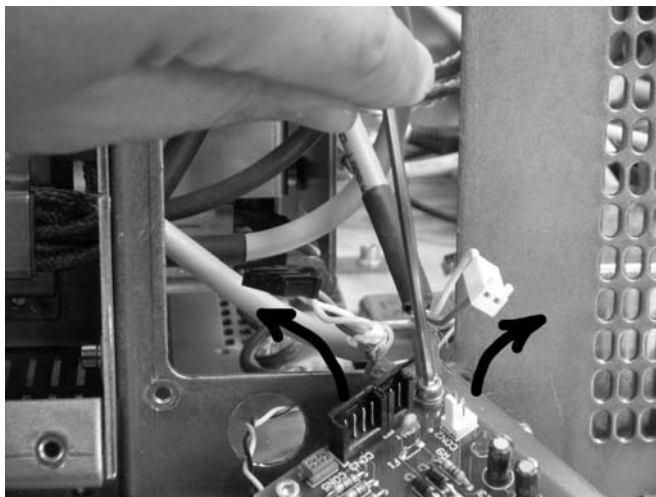


Figure 48 serial board

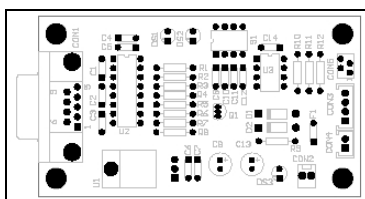


Figure 49 Serial board CS4-EL035

14 Remove the optical head covers

14.1 Remove the optical head covers

Unscrew the 4 screws below the covers of the optical head, with supplied Allen wrench 3 mm (available on accessories box).



Figure 50 Optical head

14.2 Removing the optical head bottom cover (CS4-ST054)

Unscrew the 3 screws on the optical head. You can remove the bottom cover only after removing the optical head. (Chapter 15)

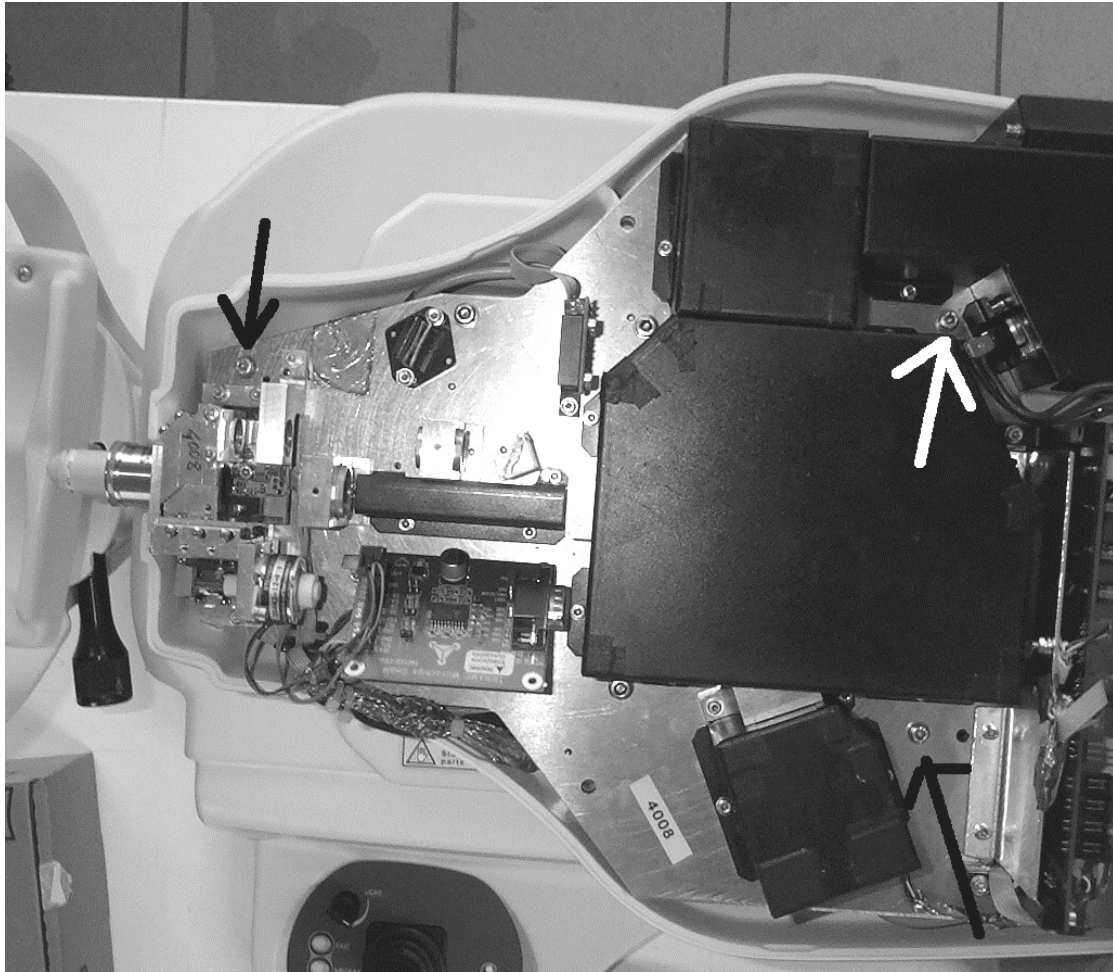


Figure 51 Optical head

14.3 Removing the optical head lamp fan

If you have not already done, perform the procedure 14 &, 14.2

Unscrew the 5 screws and remove the lamp cover. Pay attention at the klaxon (thermal sensor) and its cable.

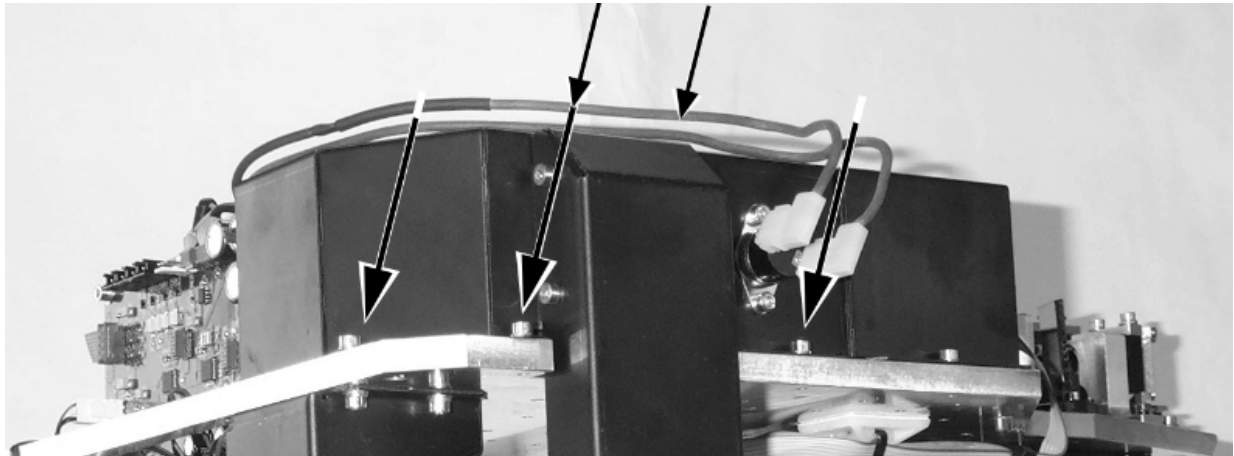


Figure 52 Screws

- Unscrew the 4 screws A, they are not visible. Remove the head lamp fan cover. Unscrew the 4 screws B. Disconnect the cable. Remove the head lamp fan.

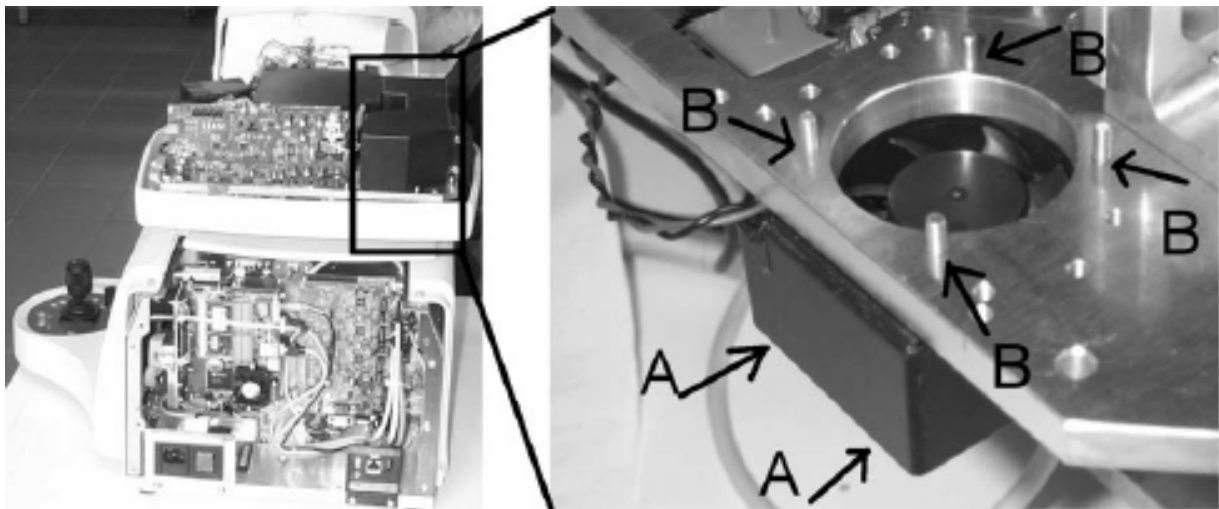


Figure 53 Head lamp fan screws

15 Remove the optical head

Disconnect the 4 cables from the head control board (CS4-EL013) connectors:

- VIDEO OUT
- RS485 (remove also the cable shield fixing)
- CNM16 (remove also the cable shield fixing)
- OUT 1

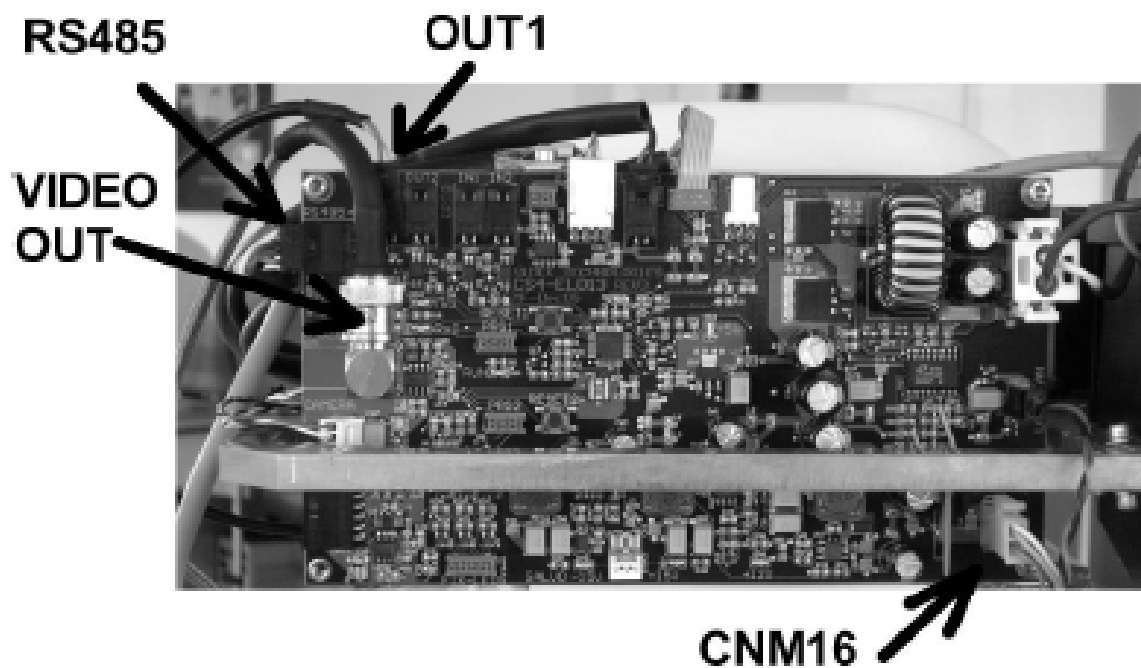


Figure 54 Control board

15.1 Optical head

- To remove the optical head, unscrew the 4 screws shown in the picture below.



Figure 55 Optical head

- Remove the optical head from the body of CS4, and place it in a safety position, or install it on the special tool (please contact NT Service).

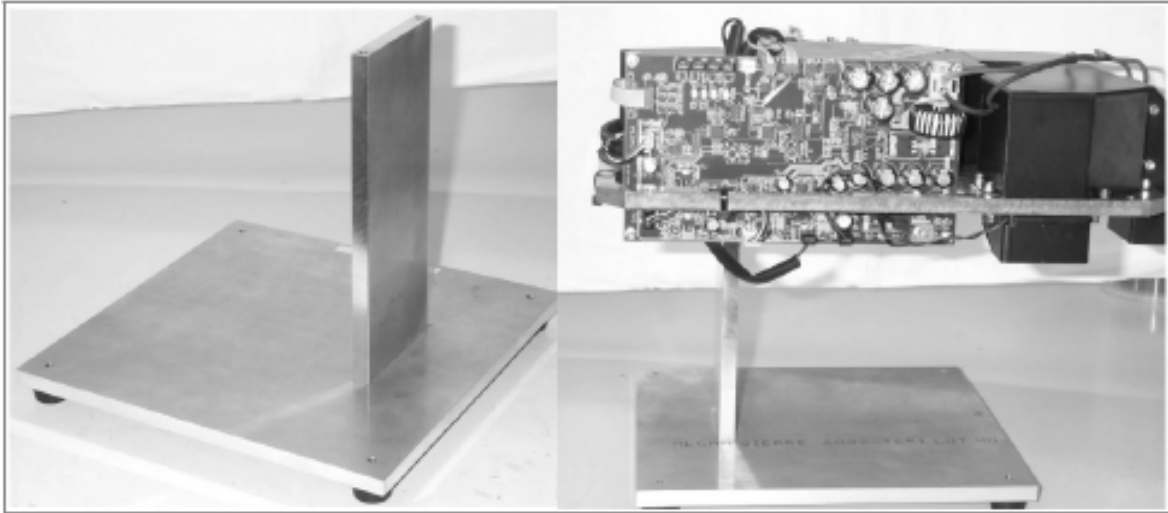


Figure 56 Service tool

- Pay attention to the galvanometer when the optical head is removed.

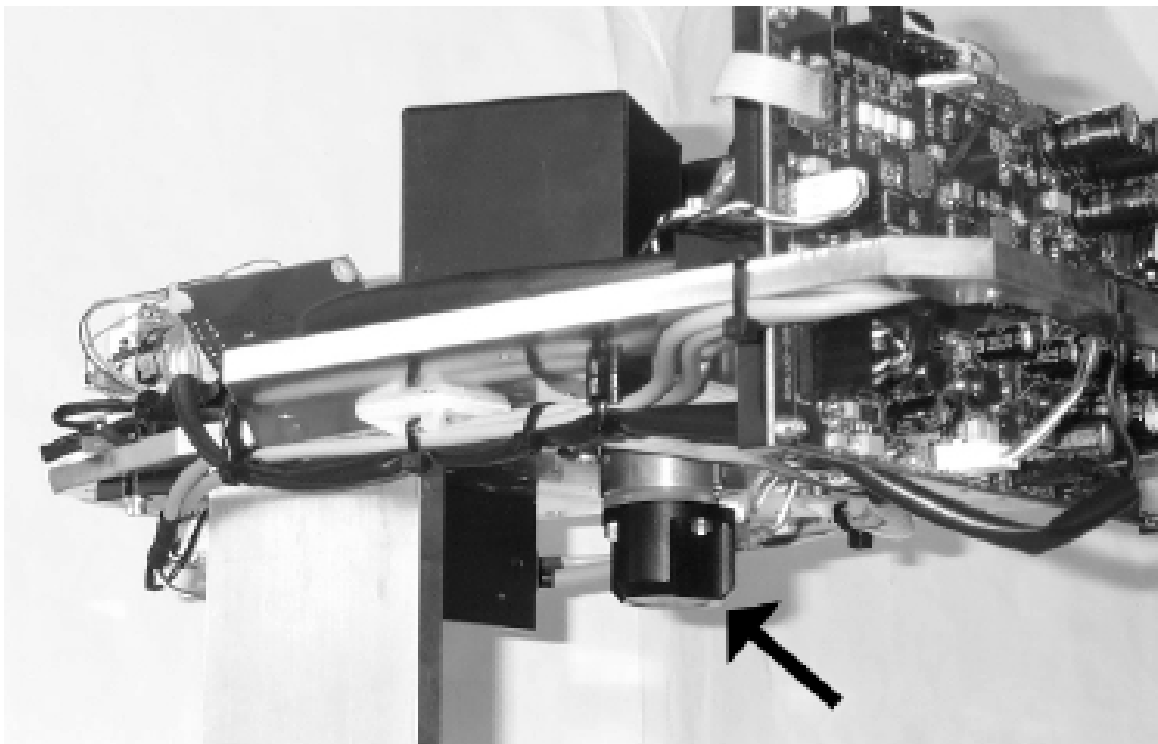


Figure 57 Galvanometer

16 Removing the chinrest and the forehead rest

If you have not already done, perform the procedure 6, 11, 19.1

Unscrew the 4 screws and disconnect the cable then, the ground wire. Remove the chinrest and the forehead rest.



Figure 58 Chinrest CS4-AP035

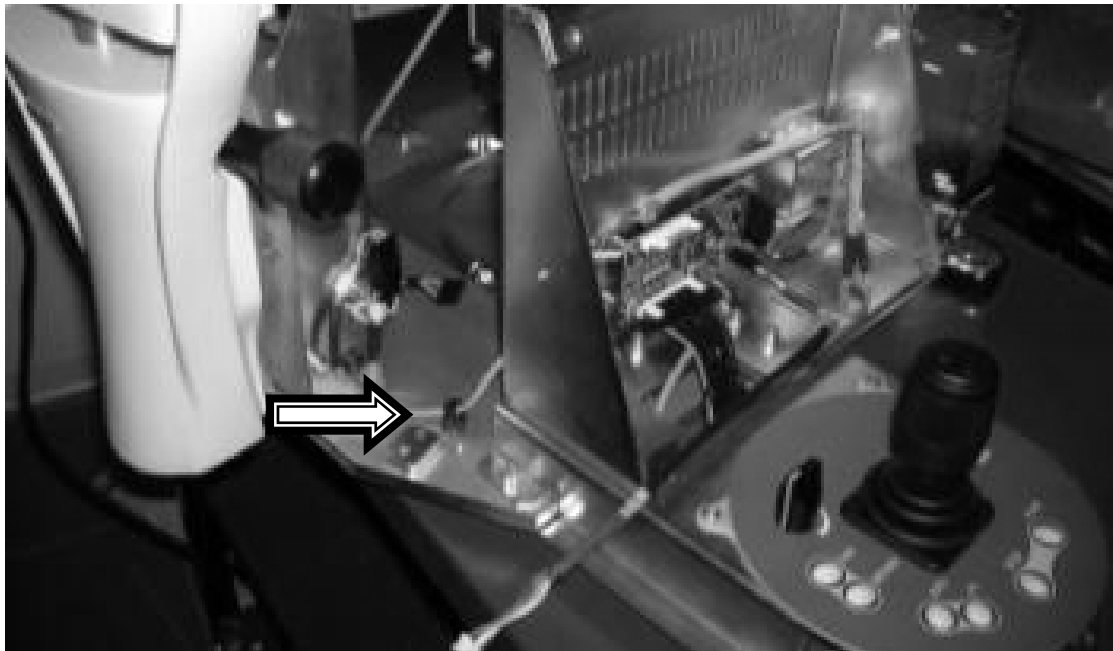


Figure 59 Cable CS4-WI103

17 Removing the chinrest sensor switches

If you have already done, perform the procedure 6, 11, 19.1, 16

Unscrew the 2 screws and remove the sensor cover.



Figure 60 Chinrest

- Unscrew the screws that hold the sheet metal and remove the sensor switches with their cable.
- After replacing or adjusting the switches, test the OD/OS right detection.

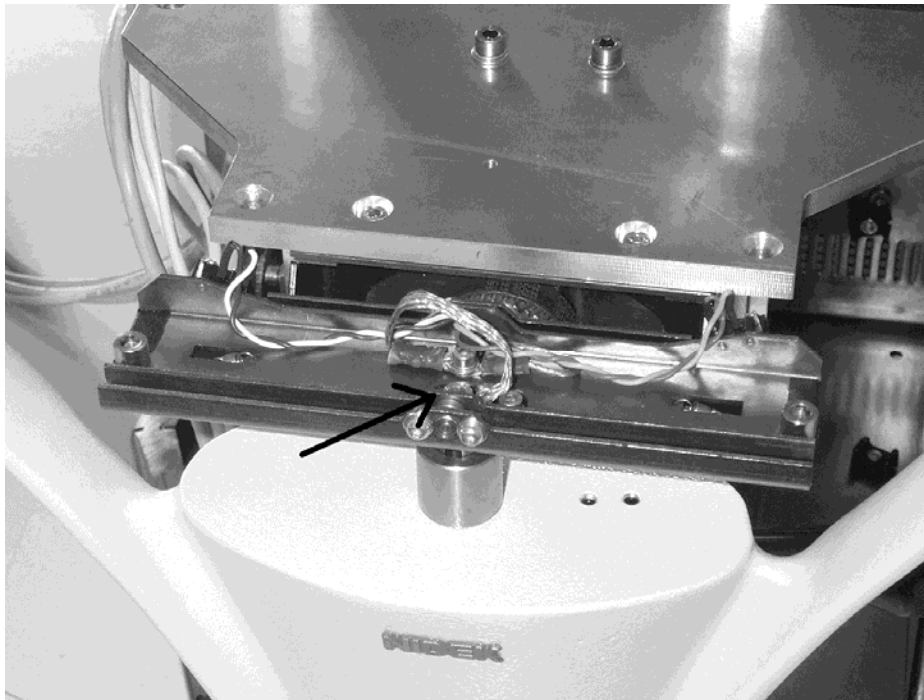


Figure 61 Switches MP1-EL028

18 Remove the plastic cover CS4-ST051

If you have not already done, perform the procedure 14, 14.2, 15

Unscrew the 4 screws and remove them.

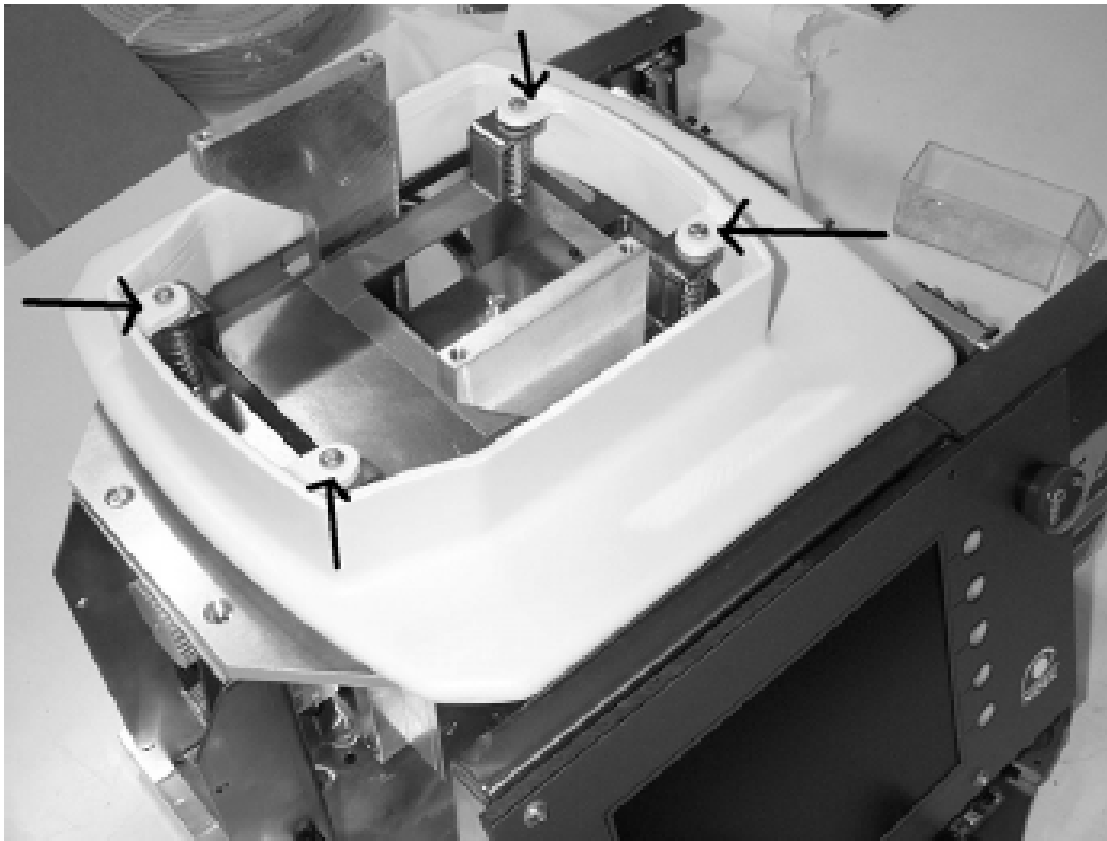


Figure 62 CS4-ST051

- Remove the raisable cover, the 4 springs and the 2 brackets assembly.

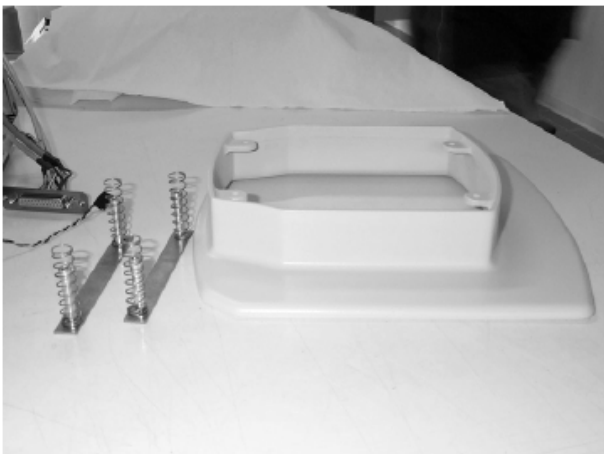


Figure 63 Cover removed

19 Remove the robot assembly

19.1 Remove the robot plastic cover (CS4-ST055)

If you have not already done, perform the procedure no. 6.

Unscrew the 4 screws, and remove the cover.

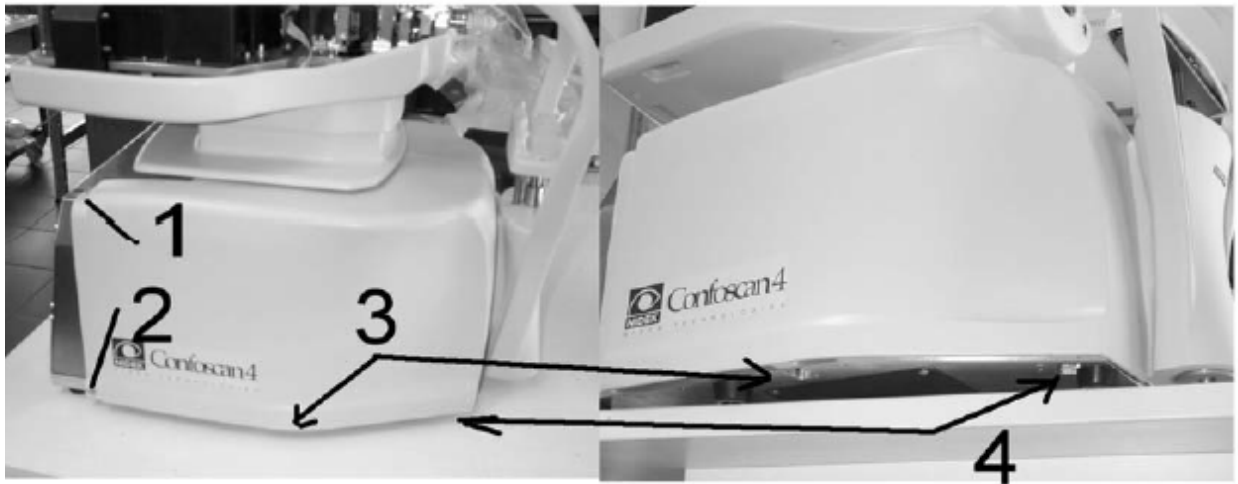


Figure 64 CS4-ST055

- The screws no. 3 & 4 are under the equipment.
- Do not turn upside down the equipment.

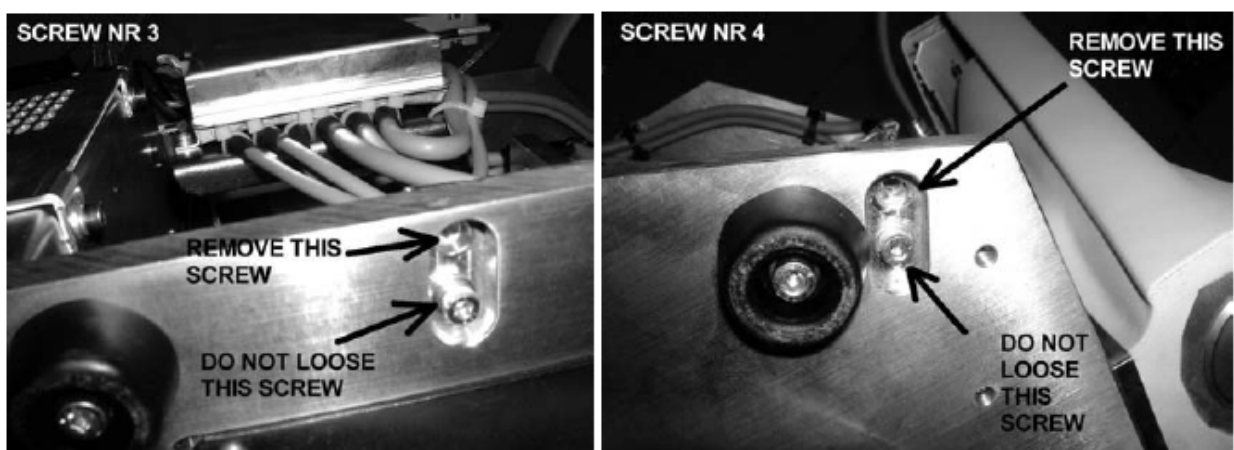


Figure 65 Robot side

19.2 Remove the Robot Assembly

If you have not already done, perform the procedure number:

11 Removing the operator side plastic cover

19.1 Removing the robot plastic cover

14 Removing the optical head upper cover

14.2 Removing the optical head bottom cover

15 Removing the optical head

18 Removing the raisable cover

Unscrew the 6 screws over the robot assembly.

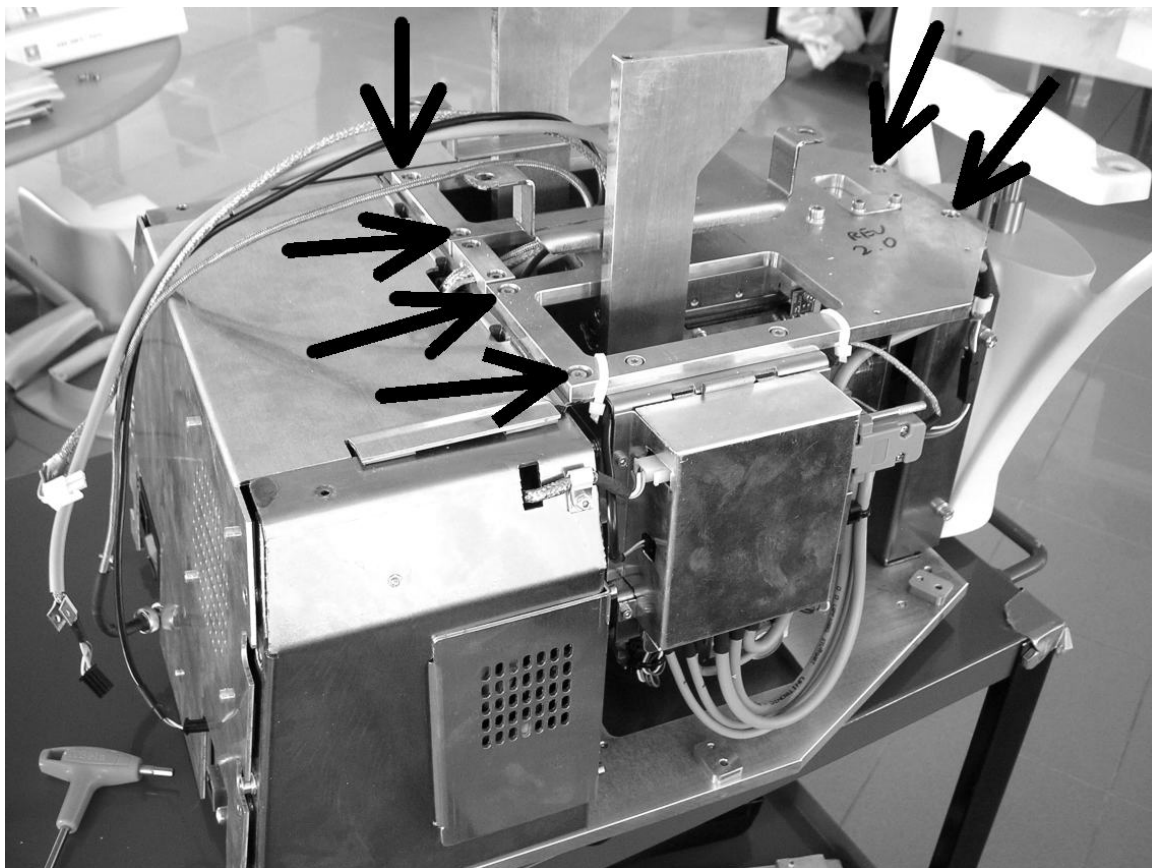


Figure 66 Robot assembly

- For unlock the robot unscrew also the two screws showed in the picture below.

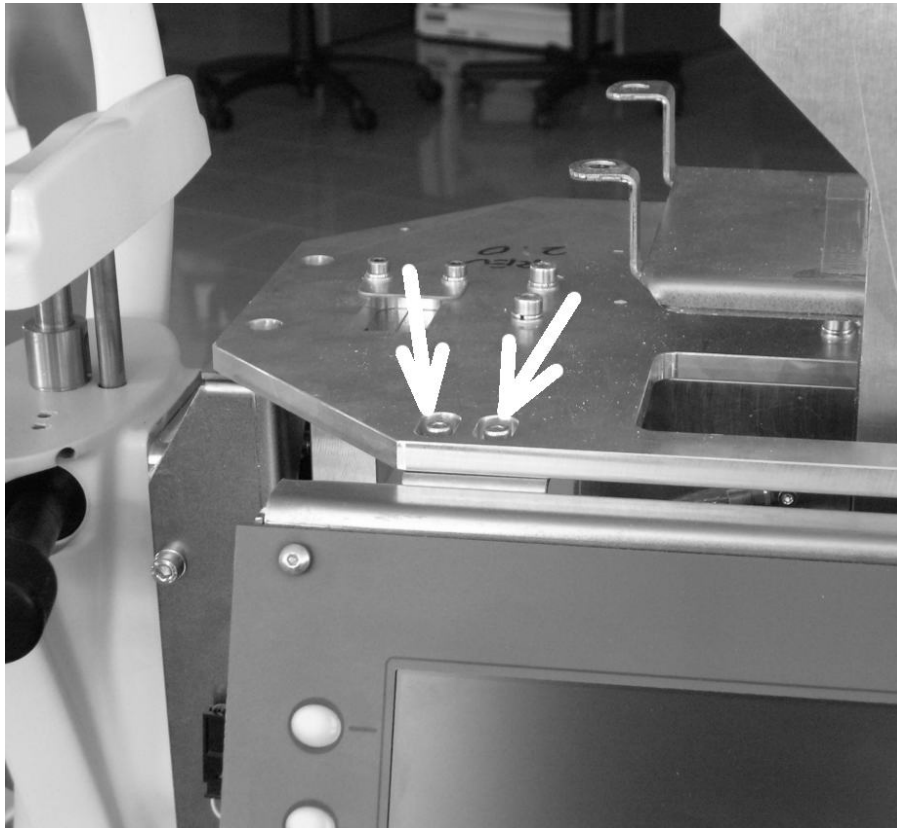


Figure 67 Robot screws

- Remove the cable fixed on the chassis unscrewing the screw as shown in the picture below.

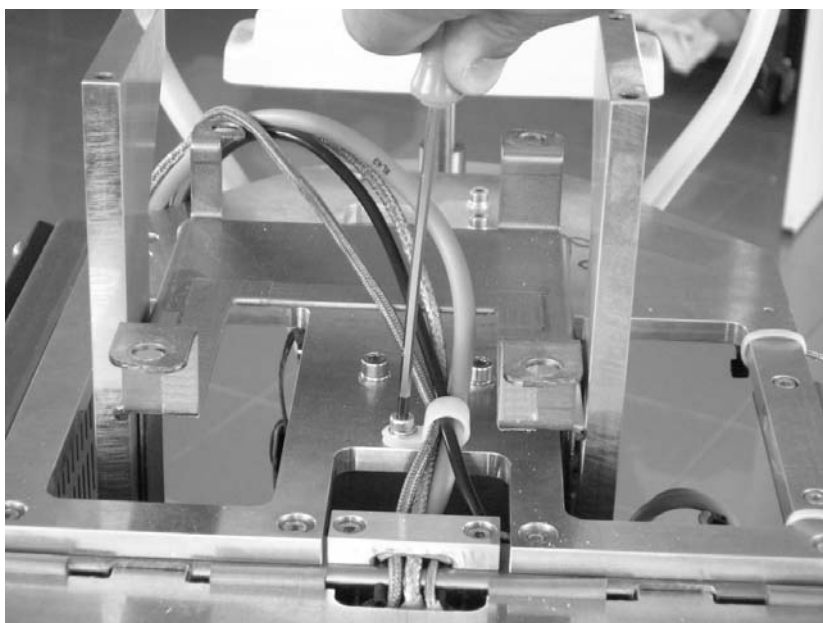


Figure 68 Robot cables

- Disconnect the RS232 cable connector, the power connector and the safety signal connector on the motion control board COM-EL005. Also cut the cable ties. (View chapter 20)

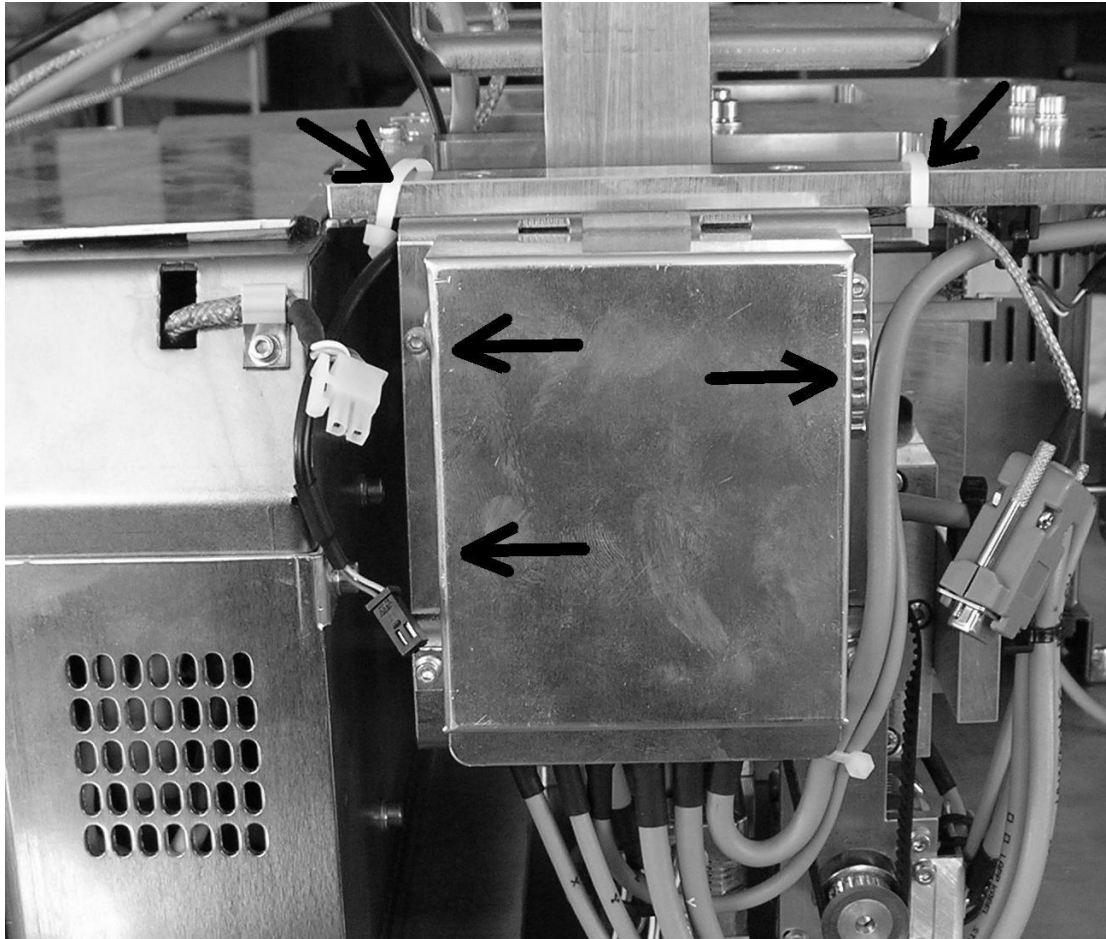


Figure 69 Motion board

- Raise and remove the robot assembly. Pay attention when you put the robot assembly on the table top, avoid any kind of damage.

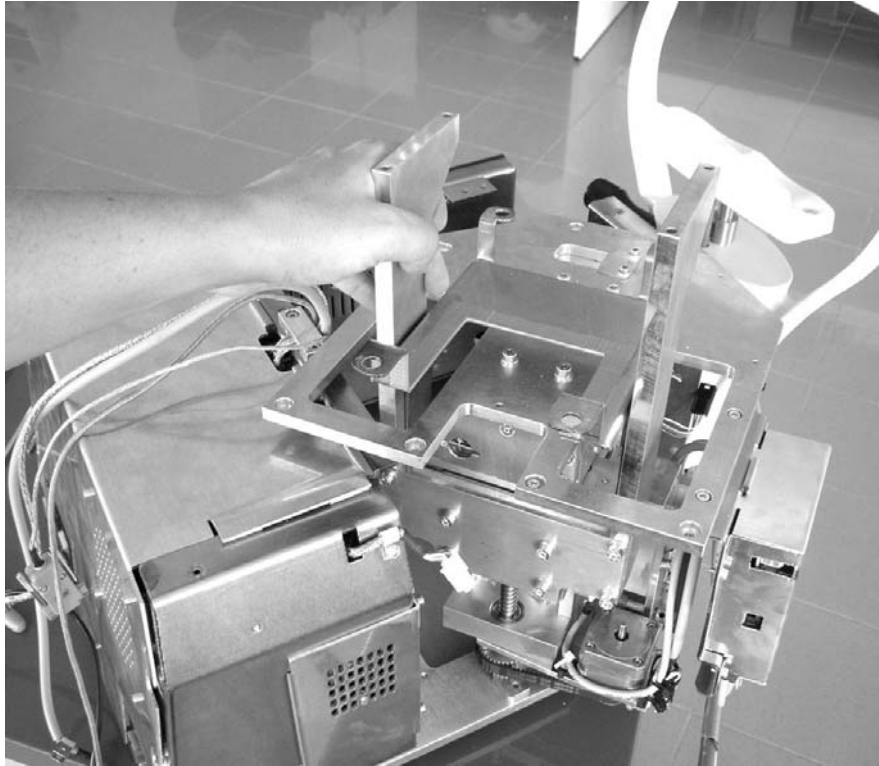


Figure 70 Robot CS4-AP002

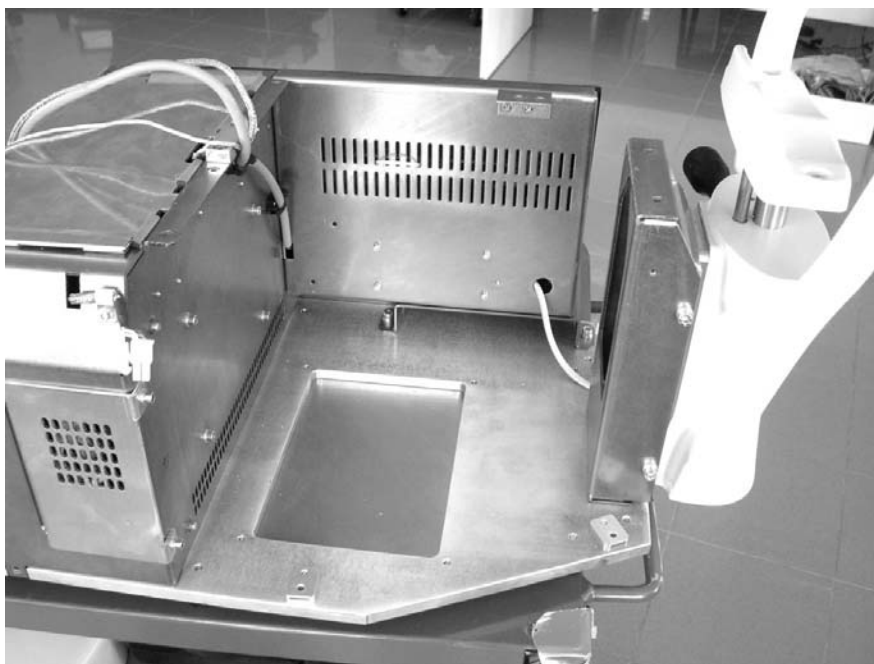


Figure 71 Chassis

20 Remove the motion control board (COM-EL005 & COM-EL006)

If you have not already done, perform the procedure no.:

6 Removing the rear external plastic cover

19.1 Removing the robot plastic cover

- Disconnect the RS232 cable connector, the power connector and safety signal connector on the motion control board.

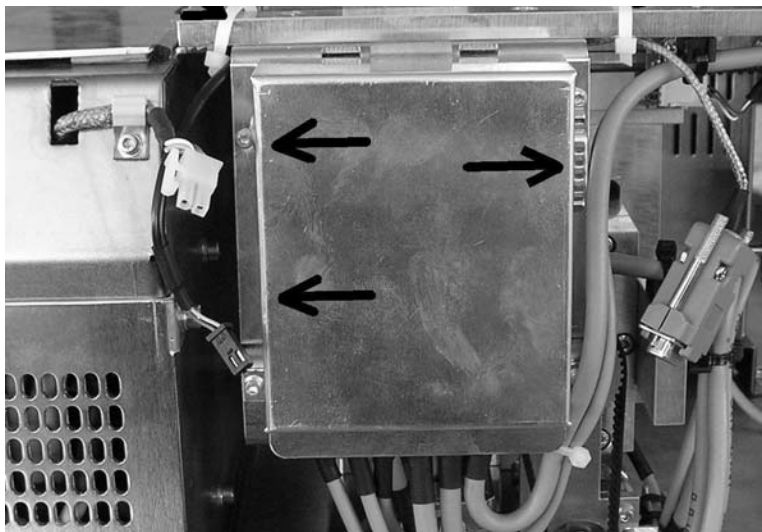


Figure 72 Remove the connectors

- Unscrew the 4 screws that fix the motion board metal box and remove it (left side first).

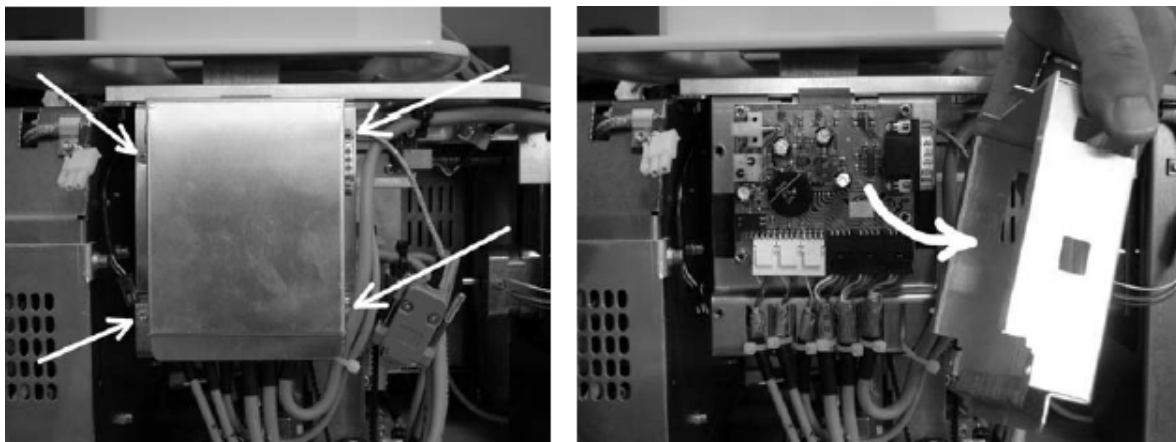


Figure 73 Metal box screws

- Disconnect all the motors connectors and home sensor connectors.

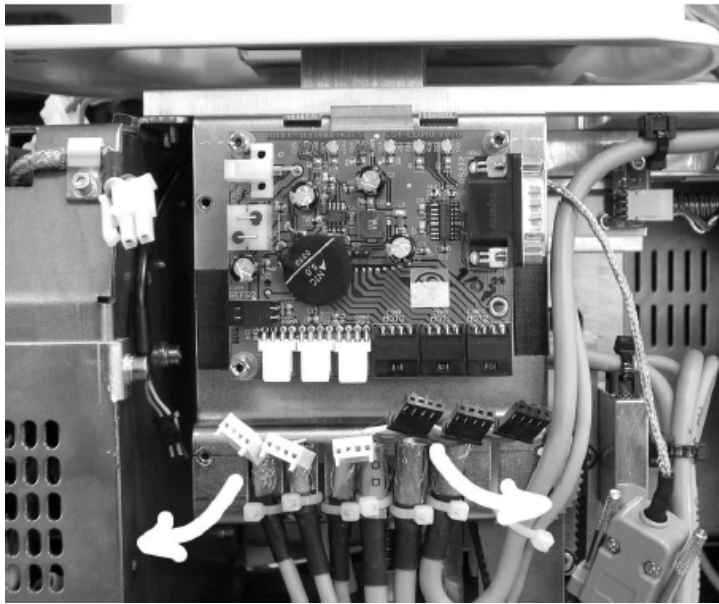


Figure 74 Motion board COM-EL006

- Remove the motion control board by unscrewing three nuts (use a 5 mm nuts screw driver). Pay attention to the three plastic washers under the nuts.

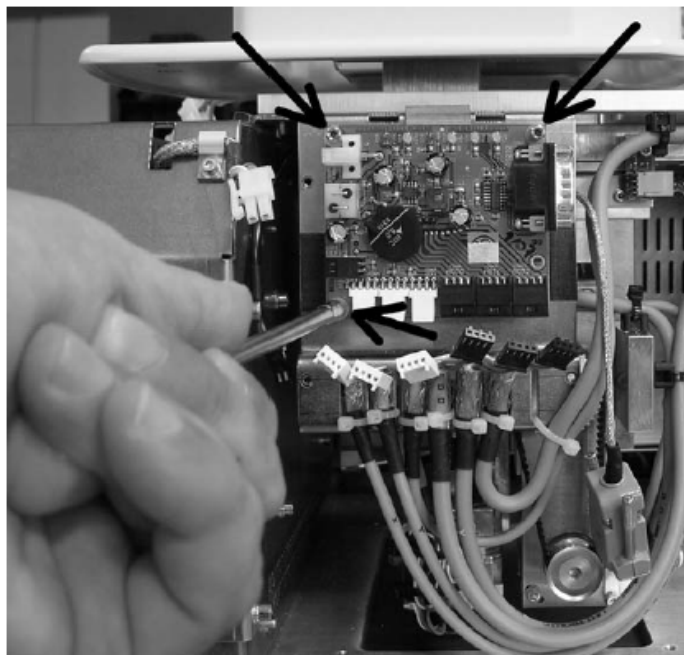


Figure 75 Motion board screws

- Board disconnected

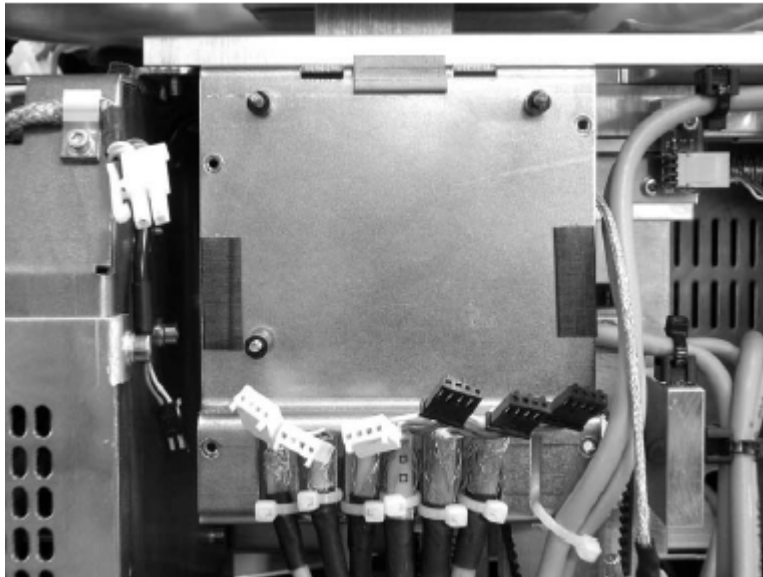


Figure 76 Board Plate

- The motion board is composed by two PCBs “COM-EL005 & COM-EL006”, pay attention to the cylindrical spacer between the two boards.
- The two PCBs may be separated.

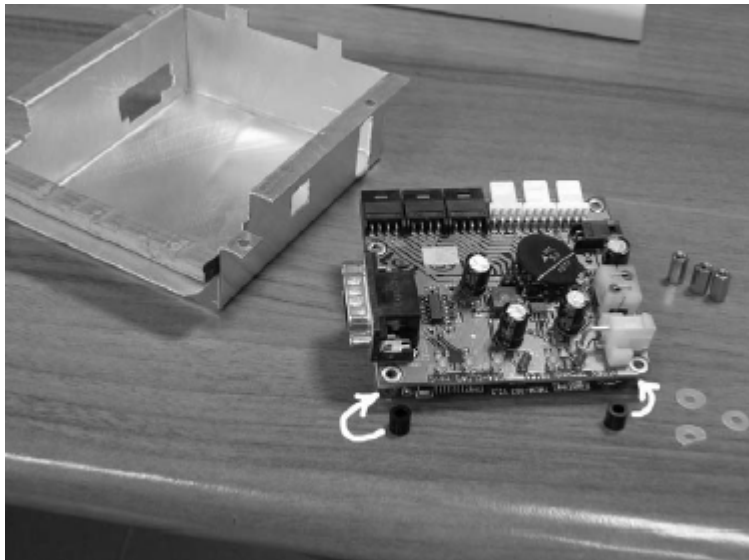


Figure 77 Cylindrical spacers

21 Remove the processor board mounting plate CS4-ST121.

If you have not already done, perform the procedure no.

6 Removing the rear external plastic cover

6.1 Removing the rear metallic internal cover

10.1 Removing the frame grabber board

10.2 Removing the processor board (embedded PC)

Unscrew the shield of the LVDS cable (PC side) Unscrew the 2 screws that fix the Embedded PC mounting plate to the base.

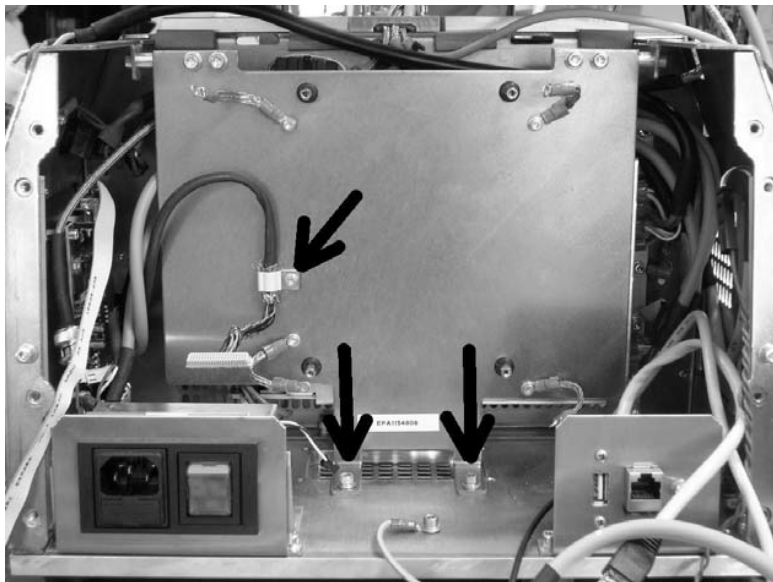


Figure 78 Electronics mounting plate screws

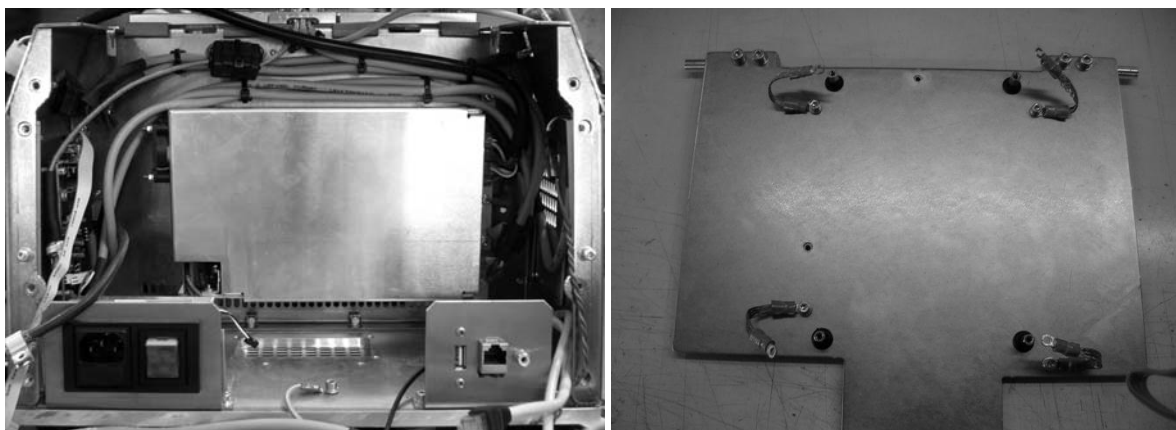


Figure 79 Embedded PC mounting plate (removed)

22 Removing the power supply (CS4-EL050)

If you have not already done, perform the procedure no.:

6 Removing the rear external plastic cover

6.1 Removing the rear metallic internal cover

10.1 Removing the frame grabber board

10.2 Removing the Embedded PC

19 Removing the robot assembly

21 Removing the processor board mounting plate

8 Removing the signal inlet plate

- Disconnect the main voltage input connector (pay attention to the right polarity when you will reconnect it)

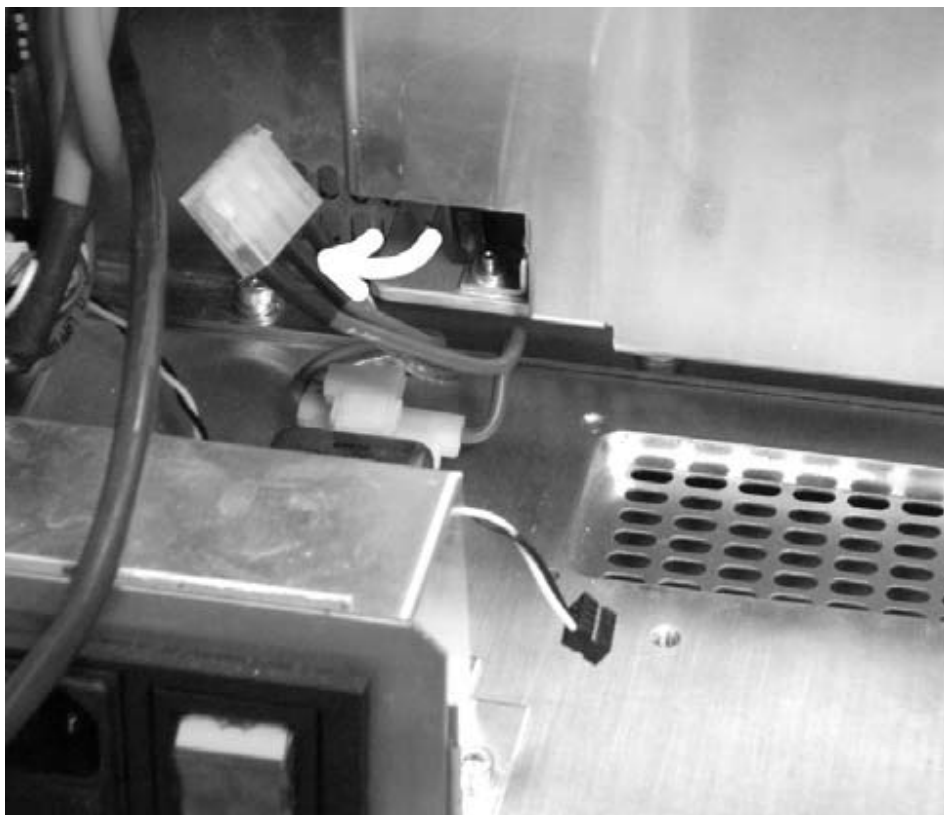


Figure 80 Power supply main input voltage connector

- Unscrew the 2 screws that fix the electric ground bar inside the rear box.

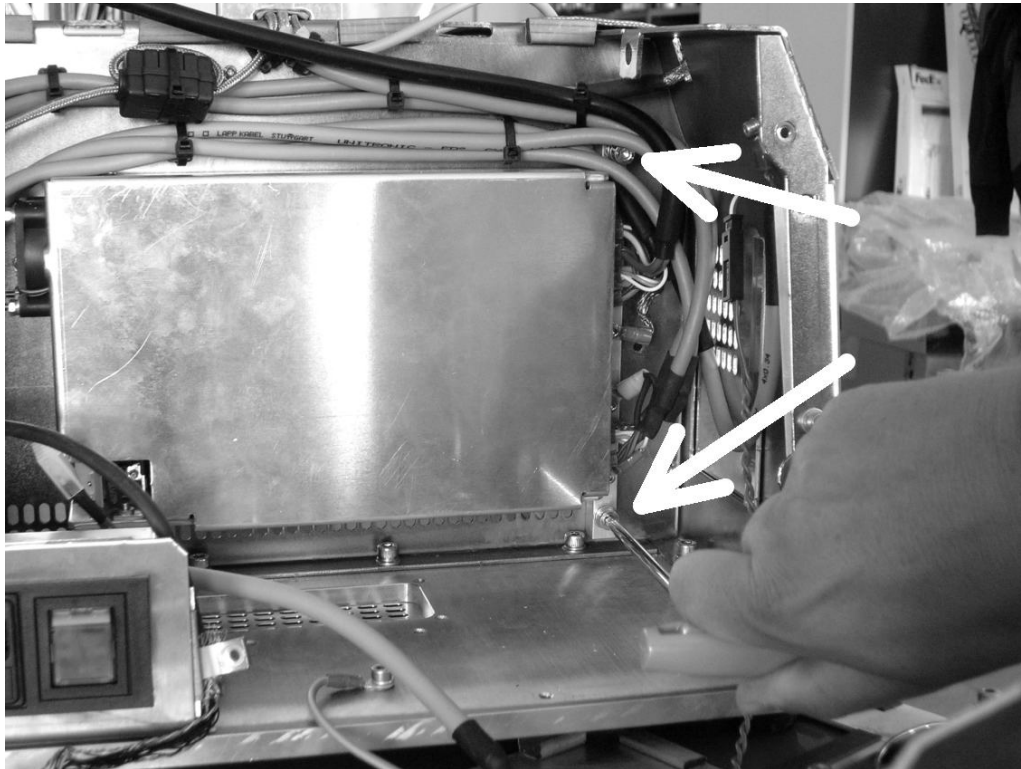


Figure 81 Power supply grounding bar removal

- Unscrew the 4 screws that fix the power supply to the chassis.

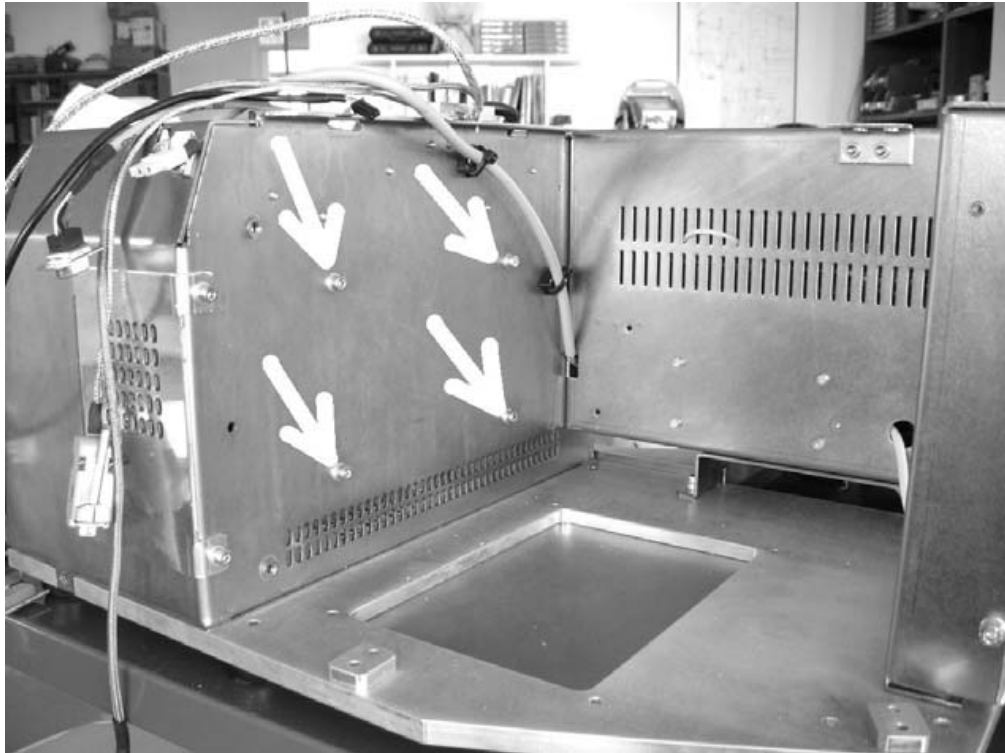


Figure 82 Power supply

- While removing the last screws, take with the hand the power supply on the other side of the chassis.
- Do not pull to remove completely the power supply, because there is the output wires still connected.

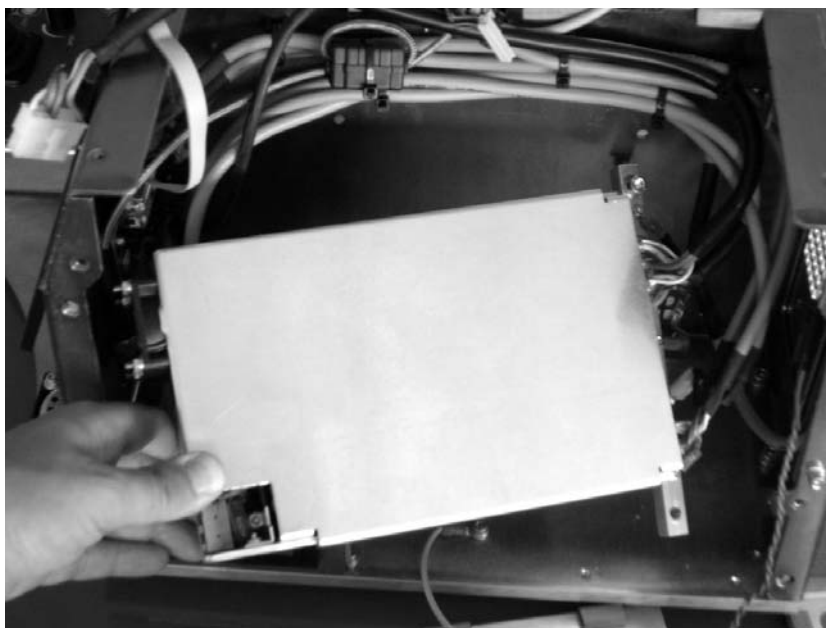


Figure 83 Power supply

- Unscrew the three screws indicated in the picture below to remove the power supply metal cover (pay attention to the fan cable attached).

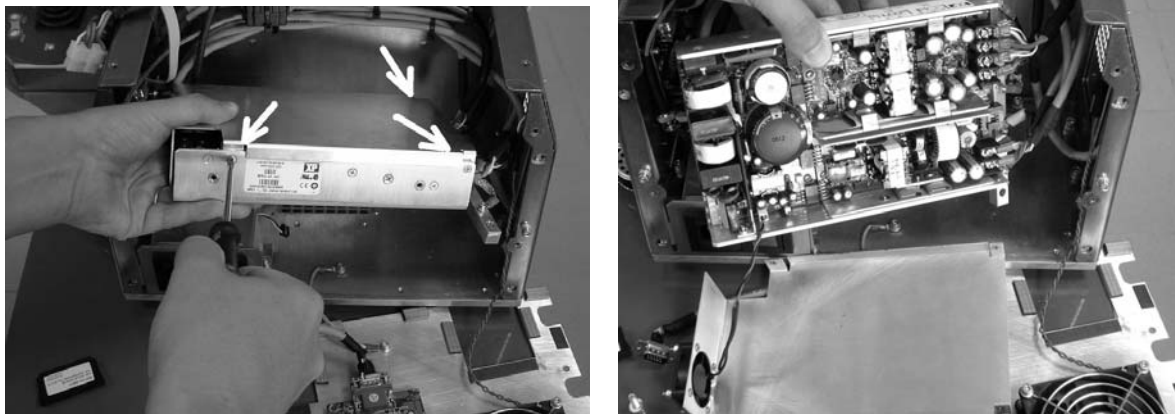


Figure 84 Power supply

- Unscrew all the cable connections and remove the power supply (CS4-EL050).

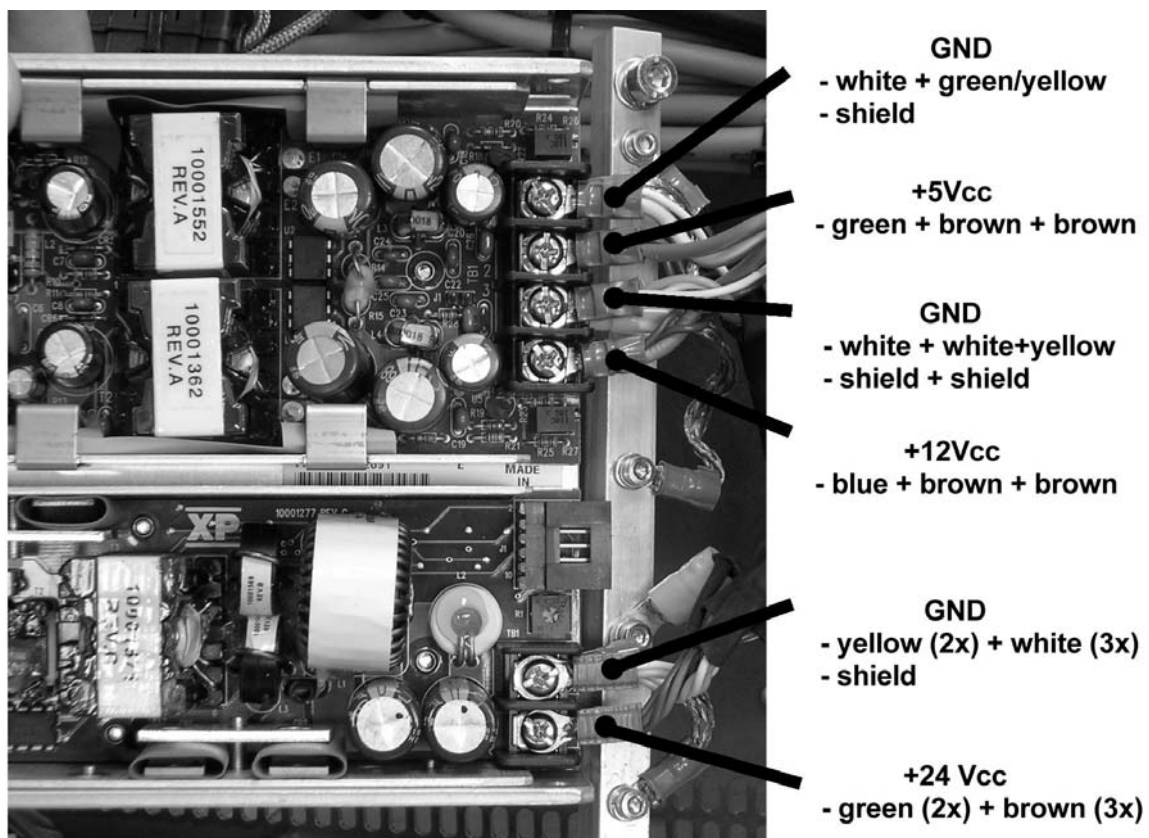


Figure 85 Power supply

23 How to update embedded Software

23.1 Warning

Disable the Windows Firewall. (Windows Firewall may cause problems such as locking the SW or frequently disconnections between PC & CS4).

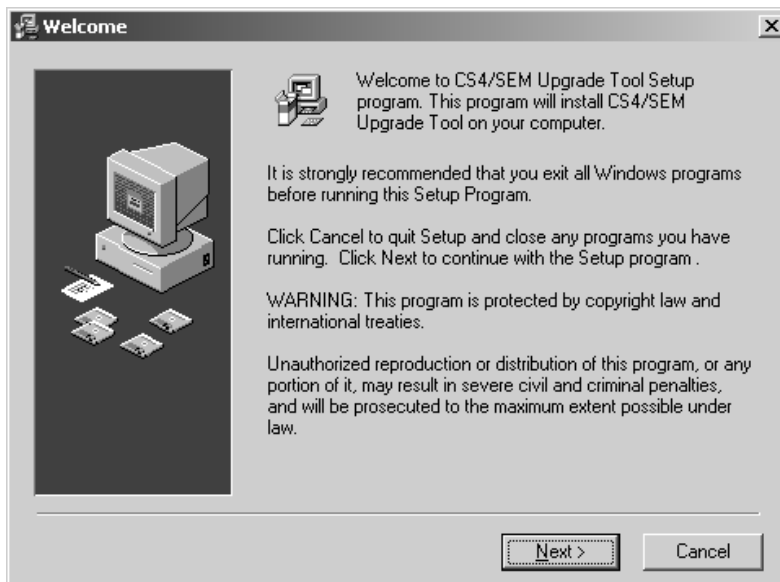
23.2 Installation steps

Insert the cd upgrade into the cd driver; installation wizard will start as shown in the pictures.



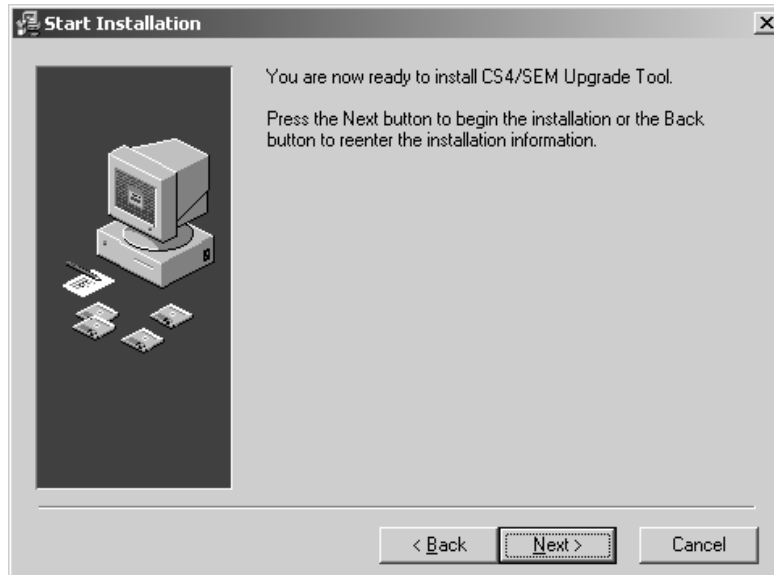
23.3 First step

Click next on the welcome windows



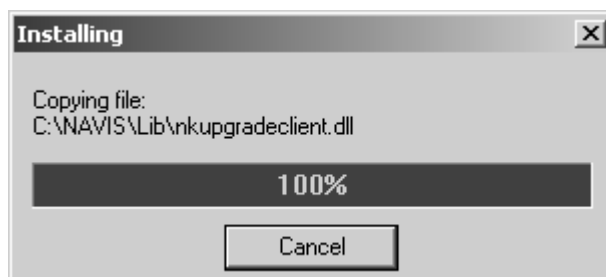
23.4 Second step

Click next to start the installation upgrade tool



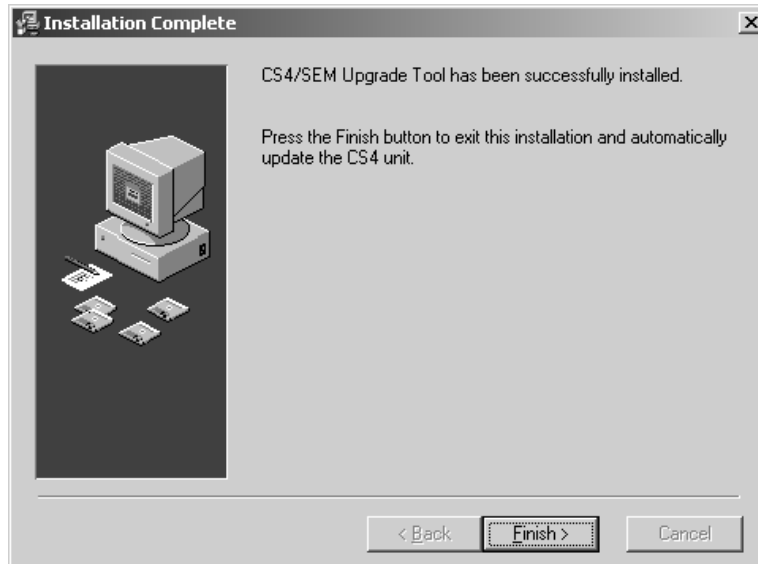
23.5 Third step

File installing



23.6 Fourth step

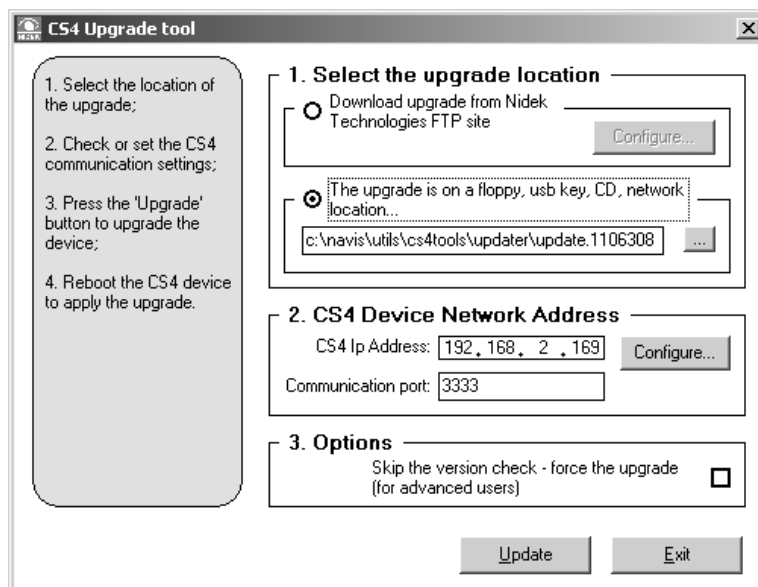
Click finish to terminate the installation



23.7 Fifth step

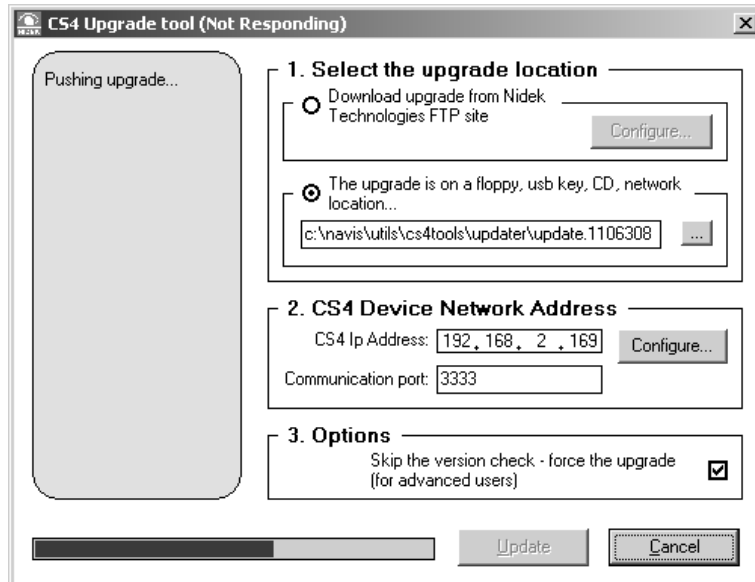
After those steps the upgrade windows tool will appear, click update again.

Pay attention; check the IP address of CS4



23.8 Seventh step

File installing



23.9 Eighth step

At the end the window of “successfully update” will appear.



Click ok and reboot the CS4 device.

24 Cable list

CS4	W	I	0	0	9	rev	0	EL013 CCD Video cable
CS4	W	I	0	1	5	rev	0	Video-out cable
CS4	W	I	0	1	7	rev	1	EL010 Joystick cable
CS4	W	I	0	3	7	rev	1	Power lamp cable
CS4	W	I	0	3	8	rev	2	Power lamp cable
CS4	W	I	0	3	9	rev	3	USB cable
CS4	W	I	0	4	0	rev	4	RS232 cable
CS4	W	I	0	4	1	rev	2	Speaker cable
CS4	W	I	0	4	3	rev	0	90deg Schuko cable
CS4	W	I	0	4	6	rev	0	VGA cable
CS4	W	I	0	7	5	rev	1	rs485 cable
CS4	W	I	0	9	8	rev	0	XP Power cable
CS4	W	I	0	9	9	rev	0	joystick rs485 cable
CS4	W	I	1	0	0	rev	0	Chinrest & Joy cable
CS4	W	I	1	1	2	rev	3	LVDS cable

25 Board list

CS4	E	L	0	1	0	rev	1	Control joystick board
CS4	E	L	0	1	3	rev	4A	Head control board
CS4	E	L	0	1	8	rev	2	Hall sensors board
CS4	E	L	0	3	1	rev	0	Fuse
CS4	E	L	0	3	4	rev	0	Fan Box
CS4	E	L	0	3	5	rev	1	RS485 interface
CS4	E	L	0	3	6	rev	0	Shaffner net filter
CS4	E	L	0	4	2	rev	0	VGA to PAL Board
CS4	E	L	0	4	4	rev	1	Frame grabber Sensoray
CS4	E	L	0	5	0	rev	0	XP Power pack
CS4	E	L	0	7	2	rev	0	LCD display
CS4	E	L	0	7	4	rev	0	Advantech PC
CS4	E	L	0	7	5	rev	0	Emergency button
MP1	E	L	0	2	1	rev	2	Fan Lamp

26 Assembly list

CS4-AP002	Robot Assembly
CS4-AP003	LCD Aassembly
CS4-AP004	Chin and Fore Rest Assembly
CS4-AP005	Joystick Assembly
CS4-AP009	Posterior Panel Assembly
CS4-AP051	W Assembly
CS4-AP052	Halogen Lamp Assembly
CS4-AP069	Shells Cover Kit
CS4-AP073	PC Assembly
CS4-AS100_1.	Tool for dimensional 40x calibration
CS4-AS101_1.	Tool for dimensional 20x Olympus calibration
CS4-AS102_1.	Tool for AA test
CS4-AS103_1.	Tool for Zscan test
CS4-CA122_0.	Micrometric support

To order the parts please contact NIDEK CO. Service department.



Eye & Health Care

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